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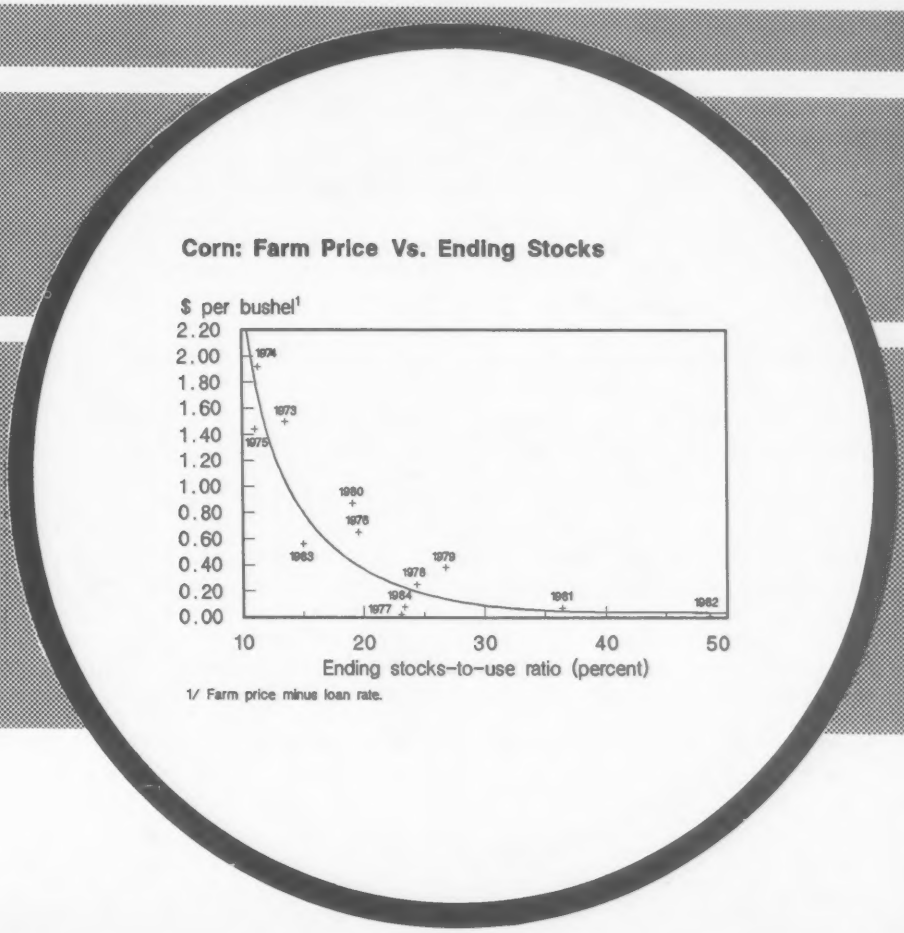

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SUMMARY

Widespread drought coupled with above normal temperatures resulted in an estimated record decline in corn yields from the preceding year. The national average yield is estimated at 78.5 bushels per acre, 34 percent under last year's yield of 119.4. Barley, oats, and sorghum also suffered from the dry, hot weather but with lesser impact on yields. The estimated barley yield is 38.9 bushels per acre, oats 38.4, and sorghum 62.2, down 26, 29, and 11 percent, respectively.

Production of feed grains in 1988 is estimated at 137.3 million metric tons and only 900,000 tons above 1983 production. This year's corn crop was estimated at slightly under 4.5 billion bushels, 3.6 billion below last year's harvest. The sorghum crop is estimated at 561 million bushels, down 180 million from 1987. Barley production for 1988 is projected at 288 million bushels, a 45-percent decline from 1987, and the oats crop is estimated at 206 million bushels, down 45 percent from last year's harvest of 374 million. This year's oats crop is the smallest on record.

Large beginning stocks of corn, sorghum, and barley will act as a buffer to feed supplies. The feed grain supply for 1988/89 is expected to be 276.3 million metric tons, 25 percent under the 1987/88 supply. Beginning stocks of corn are projected to be nearly 4.4 billion bushels, almost 50 percent of the total supply of 8.8 billion. September 1 stocks of sorghum are expected to be 725 million bushels, again over half the total supply of 1,286 million bushels. June 1 stocks of barley were 321 million bushels and contributed 51 percent to the barley supply of 629 million bushels. The exception is oats in that carryin stocks were low at 112 million bushels. With the record low crop of 206 million bushels, this gives an extremely tight supply for 1988/89. The supply of oats will be supplemented by larger imports in 1988/89.

Higher feed prices in 1988/89 are expected to cut feed and residual use by 6 percent from last year. Grain-consuming animal units (GCAU's) are expected to be down only slightly from 1987/88. However, less feed is expected to be fed per GCAU in 1988/89. Feed and residual use of corn is projected at 4.4 billion bushels in 1988/89, 250 million less than fed in 1987/88. About 500 million bushels of sorghum will be used for feed, down 20 million; and barley, and oats feed use will be 240 and 215 million bushels, respectively, down 15 and 145 million, respectively, from 1987/88 disappearance.

The Emergency Feed Program (EFP) and the Emergency Feed Assistance Program (EFAP) will mitigate the impact of tight supplies and higher prices. For livestock producers who grow their own grain, these programs provide financial assistance to help offset the loss in feed grain production. The EFP offers cost sharing by the Government for purchased feeds, and the EFAP enables eligible producers to purchase grain from the Commodity Credit Corporation at reduced prices.

Food, seed, and industrial use of corn (FSI) is estimated to be 1,224 million bushels for 1987/88, an increase of 3 percent over 1986/87. Ethanol production in the third quarter was unchanged from year-earlier output. The 1988/89 outlook is for a decrease in FSI use from 1987/88, because of projected declines in ethanol production.

Livestock producers also are faced with problems with the forage supply for 1988/89. The dry, hot weather reduced this year's hay crop to 130.5 million tons, down 12 percent from last year's crop of 149.1 million. Also, silage yields likely will be down. Relaxation of rules for haying conservation use area in drought disaster counties has added some production. Including beginning stocks, the hay supply for 1988/89 is 157.8 million tons, down 13 percent from last year. Ending stocks will be low and hay prices likely will have a record increase over a year earlier.

Drought and high demand are straining the U.S. *grain transportation systems*, pushing up costs. Some shifting of traffic from barge to rail has taken place, but limits on exports elevators ability to unload rail cars and a 20-month-old car shortage promise to limit the volume shifted.

Global supplies of coarse grains are expected to be relatively large in 1988/89 despite drought-reduced crops in the United States and Canada. Foreign production is forecast up 1 percent over 1987/88 to a near-record 580 million tons, which combined with large carryin stocks, should ensure that

there is no world shortfall. However, the ratio of world ending stocks to use is projected to decline to 15.9 percent, the lowest since 1983/84. Most of the anticipated drawdown in stocks will occur in the United States.

The U.S. share of the *world coarse grain market* is expected to fall in 1988/89 as a result of both higher prices and increased competitor supplies. Southern Hemisphere competitors who have not yet planted 1988/89 crops will be able to expand production in response to higher price signals. For the most part, other important competitors had already planted by the time the U.S. drought damage became evident, but most are expecting good harvests.

FEED GRAIN SUPPLY AND USE

Severe drought over much of the major feed grain producing regions has resulted in drastically lower yields and production for 1988, particularly for corn, barley, and oats. Sorghum yields and production are also reduced but not to the extent of the other three feed grains. Corn production is down about 37 percent, and barley and oats 45 percent from last year's production, but the sorghum crop is expected to fall about 24 percent short. Production of feed grains this year is estimated at 137.3 million metric tons, down 36 percent from last year's production of 215.2 million tons and slightly below estimated 1988/89 carryin stocks of 137.6 million tons.

On a June–May year, the feed grain supply for 1987/88 was a record 407.6 million tons. This included a record June 1 stock of 191.3 million tons, production of 215.2 million, and imports of 1.1 million. Preliminary estimates indicate the 1987/88 June–May disappearance of 230.1 million was comprised of 36.5 million tons of food, seed, and industrial use (FSI); exports of 51.4 million tons, and feed and residual disappearance of 142.2 million. Total disappearance exceeded year–earlier use by more than 7 percent. Food and industrial use, and feed and residual disappearance were both up about 3 percent, but imports rose 26 percent.

Disappearance during June–May 1987/88 left ending stocks of 177.5 million tons, 7 percent less than the record of 191.3 million in June 1987. However, 1988/89 stocks are the second largest on record, and are 21 percent more than for 1983/84, the last drought year. With production for 1988 estimated at 137.3 million tons, total supply for June–May 1988/89 would be about 316.2 million tons, or approximately 22 percent less than the previous year. If disappearance for 1988/89 is down about 5 percent, ending stocks in June 1989 would be about 98 million tons, not particularly a tight stock situation. However,

Feed grains: Supply, disappearance, and ending stocks, June/May, 1980–1987

Year	Supply				Disappearance				Ending stocks	
	Beginning stocks	Production	Imports	Total	Food & indus.	Feed & resid.	Export	Total	Govt.	Total
	Million metric tons									
1980/81	107.2	197.9	0.3	305.4	23.0	128.1	73.6	224.7	7.6	80.7
1981/82	80.7	246.2	0.4	327.3	25.2	127.1	61.4	213.7	7.9	113.6
1982/83	113.6	250.2	0.4	364.2	27.2	136.8	53.8	217.8	14.0	146.4
1983/84	146.4	136.4	0.7	283.5	29.7	126.3	56.9	212.9	24.6	70.6
1984/85	70.6	236.9	0.8	308.3	31.7	128.9	58.4	219.0	10.3	89.3
1985/86	89.3	274.4	0.7	364.4	34.8	136.3	40.7	211.8	25.5	152.6
1986/87	152.5	252.3	0.8	405.6	35.4	138.2	40.7	214.3	49.6	191.3
1987/88	191.3	215.2	1.1	407.6	36.5	142.2	51.4	230.1	47.3	177.5
1988/89	177.5	137.3	1.4	316.2		— 218.2 —				98.0

ending stocks of oats are expected to be a record low. Stocks on June 1, 1984, were 70.6 million metric tons, 27 percent lower than estimated for June 1, 1989. In addition to the feed grains, 48–50 million tons of concentrates will be available for livestock and poultry feeding from wheat and rye, processing byproducts, and crop, animal, and marine high–protein concentrates.

Corn

Disappearance of corn for the March–May quarter totaled 1.8 billion bushels, down 330 million from the December–February quarter and 113 million bushels less than disappearance a year earlier. Food and industrial use and exports for March–May exceeded year–earlier quantities; thus, the decline was entirely in feed and residual disappearance––down almost 130 million bushels.

A pattern may be emerging in feed and residual use. Starting with September–November 1986, quarterly feed and residual use rose above the corresponding quarter a year earlier for five consecutive quarters. December–February and March–May were below year–earlier disappearance. The rise for the four quarters in 1986/87 carried corn feed use to a record 4.7 billion bushels, about 625 million more than disappearance in 1985/86, a 15–percent increase. However, for the first two quarters of 1986/87, cattle on feed and market hogs on farms (two of the major feeding activities that use corn) were below year–earlier numbers, and for the third quarter were up less than 1 percent. In December–February and March–May 1987/88, cattle on feed and market hogs were up significantly from the corresponding quarters a year earlier. A possible explanation for this divergence between livestock numbers and feed and residual use is that part of the increase for September–May 1986/87 was the result of residual factors that are returning to normal levels.

Corn supply, disappearance, and stocks, March–May

Item	1986/87	1987/88
	Million bushels	
Supply		
Begin. stocks, Mar 1	8248.2	7635.2
CCC	1362.2	1767.7
FOR 1/	1339.8	1481.3
Loan	4289.0	2963.7
Uncommitted	1257.2	1422.5
Imports (Mar–May)	.5	1.6
Total Supply	8248.7	7636.8
Use		
Food, seed, & industrial	326.4	329.7
Exports	500.2	513.8
Feed and residual	1089.9	960.3
Total	1916.5	1803.8
Stocks June 1		
CCC	1491.5	1304.9
FOR	1483.5	1447.5
Loan	2742.6	2062.6
Uncommitted	614.8	1018.0
Total	6332.4	5833.0

1/ Includes special producer storage loans.

March–May use left stocks on hand June 1 of slightly over 5.8 billion bushels. Imports during June–August likely will add over a million bushels to the supply for the quarter. Disappearance for the June–August quarter is estimated at 1,483 million bushels, slightly above a year–earlier. This would leave stocks on hand September 1 of almost 4.4 billion bushels, about 500 million bushels less than ending stocks for 1986/87. Commodity Credit Corporation (CCC) inventories are expected to be about 750 million bushels, but part of this will be distributed through the Emergency Feed Assistance Program (EFAP) during 1988/89.

Generic Certificates Key to Market Availability

Generic certificate exchanges for corn in the March–May quarter totaled 1,142 million bushels, 120 million below the preceding quarter and almost 500 million below March–May 1987. The value of certificates exchanged for corn was 76.5 percent of the total value of certificate exchanges during March–May this year. This was almost the same proportion as a year earlier but well above the 63.9 percent in the December 1987–February 1988 quarter, when increased quantities of certificates were used to redeem wheat for sale under the Expanded Export Assistance program.

Certificate exchanges were increasingly important as a source of corn to the market until March–May of this year. Generic certificate exchanges for September–November 1986 amounted to 344 million bushels, equivalent to 17 percent of total disappearance of 1,985 million. By

Issue and use of generic certificates

Crop year	Value issued	Value exchanged	Value used for corn	Bushels of corn
	- - Billion dollars- -			Million
1985/86				
April-Aug	1.5	.87	.47	252.6
1986/87				
Sep-Nov	1.1	.81	.52	343.8
Dec-Feb	3.2	1.51	1.21	750.9
Mar-May	2.3	3.52	2.70	1,641.0
June-Aug	1.4	.96	.78	436.1
1987/88				
Sep-Nov	1/4.4	2.81	2.04	1,334.1
Dec-Feb	3.4	2/3.25	2/2.08	2/1,261.8
Mar-May	2.8	3.41	2.61	1,141.7

1/ Through December 16.
2/ Partly prorated from report for 3/22/88.

March-May 1987, certificate exchanges amounted to 1,641 million bushels or the equivalent of almost 86 percent of the disappearance of 1,917 million. For the following three quarters, while generic exchanges were less than in March-May, they exceeded the corresponding quarter of a year earlier, both in bushels exchanged and as a percent of equivalent disappearance for the quarter. However, for March-May of this year, certificate exchanges were not only 500 million bushels less than for March-May 1987, but only equal to the equivalent of 63 percent of disappearance compared with almost 86 percent a year earlier.

Another significant change is in the source of corn used for exchanges. From the beginning of the generic certificate program in April 1986 through the September-November quarter of 1987, 90 percent or more of the exchanges for corn were from 9-month loans. Of the accumulated exchanges of corn through December 1987, 9-month loans accounted for 94.7 percent, CCC inventories 4.6 percent, and Farmer-Owned Reserve (FOR) loans 0.7 percent. For the December 1987-February 1988 quarter, 9-month loans were the origin of 81 percent of exchanges and for March-May, 61 percent.

In March-May, CCC inventories were the source of almost 37 percent and FOR loans a little over 2 percent. For the June-August quarter, certificate exchanges will be a very large proportion of total disappearance, but the CCC inventory and FOR loans will likely account for the origin of more than half of the exchanges. For June and July, about 340 million bushels of CCC inventory and 186 million bushels of FOR loans were exchanged, or 56 percent of total exchanges of 934 million bushels.

On September 1, 1986, the CCC held in inventory 1,867 million pounds of dairy products, 1,832 million bushels of grain, 774,000 bales of cotton, and 227.3 million pounds of other commodities. Between September 1, 1986, and August 1, 1988, the CCC acquired 3.1 billion bushels of grain and 157,300 bales of cotton. On August 1, the inventory included 383 million pounds of dairy products, 1,691 million bushels of grain, 2,622 bales of cotton, and 9.6 million pounds of other commodities.

Source of corn disappearance by quarter

	Source of Generic exchanges					Total
	CCC inv.	FOR loans	9-Month loans	Total	Other	disappearance
1986/87						
Sep-Nov	23.9	2.9	316.9	343.7	1,605	1,984.7
Dec-Feb	14.0	3.0	734.0	751.0	1,306.6	2,057.6
Mar-May	44.9	7.3	1,588.8	1,641.0	275.5	1,916.5
June-July	40.3	4.3	391.4	436.0	1,015.0	1,451.0
1987/88						
Sep-Nov	53.2	14.0	1,266.9	1,334.1	843.8	2,177.9
Dec-Feb	222.4	16.2	1,023.1	1,261.7	872.4	2,134.1
Mar-May	419.6	27.9	694.2	1,141.7	662.1	1,803.8
June-July 22	339.9	186.1	408.0	934.0		

The large stocks of commodities on hand September 1, 1986, plus the large quantity of commodities acquired from forfeited loans the past 2 years, provided the basis for the $19.8 billion of generic certificates issued from September 1986 through June 1988.

CCC inventories are now greatly reduced and acquisitions during 1988/89 will be small. Moreover, the EFAP likely will further reduce feed grain inventories this year. As CCC loan activity and inventories are reduced, the incentive for and ability to issue certificates will be limited during 1988/89.

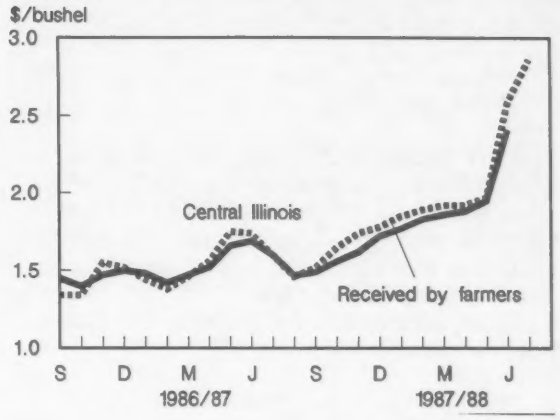
Prices Sharply Higher; FOR Released

Corn prices worked steadily higher from September to May as tightening free stocks implied the need to redeem 9-month loans for cash to meet market demands. All of the September 1 carryin stocks were tied up in CCC inventory, FOR loans, and 9-month loans. Moreover, by March 1, 1988, more than 4.1 billion of the 7.1 billion bushels harvested in 1987 had been placed under loan, leaving only 3.0 billion uncommitted. The disappearance for September-March of 4.3 billion bushels was met with generic certificate exchanges of 2.6 billion bushels, a small amount of CCC cash sales, and the balance from uncommitted stocks. Only 1.4 billion bushels of uncommitted stocks were on hand March 1, but expected use was 3.5 billion for March-August.

The national average loan rate for 1987 corn was $1.82 a bushel, and a 9-month loan accrues interest at a rate of about 1 cent per bushel per month. In April, on a national average basis, a farm price of $1.84-$1.88 a bushel would be necessary to cover the loan and accrued interest on most outstanding 1987 crop loans. The price received by farmers averaged $1.88 for April.

In May, the average farm price rose to $1.95 as free stocks tightened and rain fell far short of normal over the Corn Belt. As dry weather continued in June, the market began to anticipate a severe drought and prices rose sharply. The June average price at Central Illinois elevators averaged $2.67, up 69 cents from $1.98 in May. However, for the week of June 21-27, the Central Illinois price averaged $3.17.

Monthly Average Corn Prices



Price at the markets used to estimate the daily price received by farmers followed a similar pattern, and release of the FOR was triggered. On June 28, Secretary Lyng announced release of the FOR.

The FOR remains in release status for 1 month beyond the month it was released. Thus, August 1 was the first review date of the release status of corn. Rains over much of the Corn Belt in mid-July eased prices and for the last week of the month, the Central Illinois price averaged $2.54. Prices at the four principal markets dropped about the same amount as Central Illinois, and on August 1 the release status for the FOR ended. The FOR decreased 100 million bushels from June 29 to July 27. However, 99 million bushels were exchanged for generic certificates, leaving cash redemption of no more than 1 million bushels.

Drought Reduces Corn Crop; Large Stocks Act as Buffer

According to the National Weather Service, April, May, and June 1988 were the driest spring months on record for the Eastern Corn Belt (Ohio, Indiana, Michigan, Wisconsin, and Illinois) and among the 5 driest years for the Western Corn Belt (Missouri, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, and Kansas). While there were scattered thunderstorms over much of the Corn Belt in the last half of July, the rains come too late for many corn fields.

The National Agricultural Statistics Service (NASS) estimated the corn crop at nearly 4.5 billion bushels on August 1, down 37 percent from last year's crop of 7.1 billion. The national average yield was estimated at 78.5 bushels from 57.1 million acres expected to be harvested for grain.

Carryin stocks of almost 4.4 billion bushels of corn plus a small amount of imports will give an estimated total supply for 1988/89 of a little over 8.8 billion bushels. This will be about 26 percent less than last year and the smallest supply since 1984/85. However, stocks are still substantially above last year's disappearance.

Disappearance for 1988/89 is estimated at nearly 7.3 billion bushels, 340 million less than forecast use in 1987/88. FSI use is expected to be down slightly. Exports are likely down 75 million bushels, and feed and residual disappearance is expected off about 250 million bushels. The shutdown of a number of ethanol plants is the basis for the decline in FSI use. Even with higher corn prices, world needs are expected to hold exports near this year's level.

Higher feed prices are expected to modify livestock and poultry numbers modestly, and less weight is likely to be added in feedlots this year. These factors are expected to drop the feed and residual use about 250 million bushels below 1987/88 use. This would be the smallest decline in a drought year since the 230-million-bushel decline in 1970. However, corn production then was down only 11 percent and the average farm price rose only 15 percent. This year the average farm price is expected to be up 20-40 percent from last year. The Emergency Feed Program and the Emergency Feed Assistance Programs are expected to be instrumental in reducing the impact of the drought and higher prices on the livestock and poultry economy.

Emergency Feed Provision

On August 12, President Reagan signed into law the Disaster Assistance Act, which modified two existing programs: the Emergency Feed Program and the Emergency Feed Assistance Program. The EFP provides for Government sharing of 50 percent of the purchased cost of feeds up to 5 cents a pound. The EFAP enables eligible producers to receive grains from the CCC inventory at 75 percent of the county loan rate. Both programs are subject to the same eligibility requirements and limitations:

- Livestock producers must grow their own feed.
- Producers must be in counties declared eligible for drought assistance.
- Producers must each have a 40-percent loss because of the drought.
- A producer's gross revenue must be less than $2.5 million.
- Upon proof of eligibility, a producer can receive the lesser of 10 pounds of feed per day per animal unit or the computed crop loss, less the available feed on hand.
- Maximum assistance is $50,000 per year.

Ending Stocks Expected Below 2 Billion Bushels

Total use of nearly 7.3 billion bushels of corn out of a supply of 8.8 billion for 1988/89, implies ending stocks of nearly 1.6 billion on September 1, 1989. This would be a reduction of almost 2.8 billion bushels from forecast ending stocks a year earlier -- more than 250 million bushels greater than the reduction in ending stocks during 1983. However, ending stocks for 1988/89 will not be as tight as in 1983.

At 1.6 billion bushels, the ending stocks-to-use ratio would be 21.7 percent compared with a ratio of 15 percent for 1983/84. Stock ratios of 20-25 are at a critical point in the relationship between prices and the ending stocks-to-use ratio (see cover chart and page 26). At ratios larger than 25, prices are close to the floor provided by the loan rate. At ratios less than 20, price becomes increasingly responsive to further tightening of the supply, i.e, lower stocks to use ratios.

The years 1973, 1974, 1979, 1980 and 1981 appear to represent an upward bound to the relationship between prices and ending stock

ratios. The relationship for these years is given by the equation, $y = 3.88 - .21 X + .002966 X^2$ (see special article page 26). With ending stocks forecast at 21.7, this equation gives an estimate of 72 cents as the difference between the farm price and the loan rate. Adding the loan rate of $1.77 for 1988/89 gives a forecast of $2.50 for the average prices received by farmers.

Corn Plantings Likely To Increase Next Year

The Food and Security Act of 1985 limits the maximum Acreage Reduction Program (ARP) to 12.5 percent when ending stocks are forecast to be below 2 billion bushels. Based on the August forecast for ending stocks next year, factors point toward fewer acres set aside and larger plantings next year. However, some of the increase in potential corn acreage may be planted to soybeans because the Disaster Assistance Act of 1988 provides for no loss of crop acreage base if 10–25 percent of permitted acres are diverted to soybeans.

Sorghum

Total supply of sorghum for the 1987/88 crop year was 1,484 million bushels. June 1 stocks were reported at 814.5 million bushels, resulting in a disappearance of 670 million bushels for the September–May period, 16 million bushels more than for the corresponding period in 1986/87. Exports were 185 million bushels, about 30 million bushels above a year earlier. However, FSI use of almost 11 million bushels was almost a million less than last year, and feed and residual use was down almost 14 million bushels.

Generic certificate exchanges for sorghum amounted to 362 million bushels during September–May, equivalent to 54 percent of the total disappearance for the period. Seventy-nine percent of the certificate redemptions came from 9-month loans, 19 percent from CCC inventory, and 2 percent from the FOR. Certificates exchanged for sorghum were worth $642 million, 6.8 percent of the total value of generic certificates exchanged from September 1987 through May 1988.

Sorghum supply, disappearance, and stocks, September-May

Item	1986/87	1987/88
	Million bushels	
Supply		
Beginning stocks Sept. 1		
CCC	207.2	408.9
FOR 1/	74.9	92.9
Loan	270.1	279.4
Total	551.0	743.3
Production	938.1	740.9
Total supply	1489.1	1484.2
Use		
Food, seed, and industrial	12.0	10.8
Exports	154.8	185.4
Feed and residual	487.3	473.5
Total Use	654.1	669.7
Ending Stocks		
CCC	400.4	511.4
FOR 1/	94.0	80.4
Loan	307.0	148.0
Free	33.6	74.7
Total	835.0	814.5

1/ Includes special producer storage loans.

Sorghum disappearance for June–August this year is expected to be about 90 million bushels. Exports are estimated at 40 million bushels, FSI at 3 million, and feed and residual at 45 to 50 million. This disappearance would leave ending stocks of almost 725 million bushels, 2–3 percent below year–earlier ending stocks.

Drought Less Severe in Sorghum Producing Region

In general, sorghum producing areas have not been subjected to as severe a drought as the major corn, barley, and oats growing regions. As of August 1, the sorghum yield was estimated at 62.2 bushels per acre, 11 percent below last year's record of 69.9 bushels. In contrast, the corn yield is estimated to be down 34 percent, barley 26 percent, and oats about 26 percent.

Sorghum production is estimated at 561 million bushels. Adding forecast carryover stocks of 725 million bushels brings total estimated supply for 1988/89 to 1,286 million bushels, almost 200 million below the 1987/88 supply.

Disappearance for 1988/89 is forecast at 715 million bushels, almost 45 million below

expected disappearance for 1987/88. FSI use is expected to be up a million bushels, but exports are forecast off by 25 million and feed and residual use likely will be down about 20 million. Tight free stocks will limit use inasmuch as a large share of beginning stocks will be tied up in the FOR and CCC inventory. Fewer generic certificates will be available for exchange, and the FOR is not expected to be triggered during 1988/89.

Ending stocks on September 1, 1989, would be about 571 million bushels, down about 154 million, but most of this would be tied up in CCC inventory and loans.

Barley

Barley production for 1987 was 527 million bushels, 14 percent below the record 611 million produced in 1986. Beginning stocks were 336 million bushels, and 14 million bushels were imported, for a total supply of 876 million for 1987/88.

Total barley disappearance for 1987/88 was 555 million bushels, 53 million below the record level in 1986/87. Reduced exports accounted for 11 million bushels of the total decline, with the balance attributed to a decrease in feed and residual use to 255 million bushels. FSI use was 174 million bushels, unchanged from 1986/87.

The season average price received by farmers for all barley in 1987/88 was $1.81 a bushel, 20 cents above the year-earlier average, but still 30 cents below the previous 5-year average. Malting barley prices averaged $2.04 a bushel at Minneapolis, compared with $1.89 for 1986/87. Duluth feed barley prices averaged $1.78, compared with $1.44 for the previous year. (The feed price reporting point changed to Duluth from Minneapolis in March 1987.) Stronger feed barley prices reflected higher corn prices and the continued relatively high level of exports for the same period.

Barley stocks were 321 million bushels on June 1, 1988, down 15 million from year-earlier levels. Stocks were distributed as follows: FOR--109 million bushels, CCC inventory--50 million, free--162 million. Free stocks that were outstanding under loan totaled 89 million bushels. The ending stocks-to-use ratio was 58 percent, similar to the previous 2 years, but well above the 39.2 percent average for 1980-85.

Program enrollment for barley declined to 80 percent in 1988 from 84.3 percent for the 1987 crop. This may reflect the decrease in both the target price and the basic loan rate this year. Preliminary estimates for 1988 indicate 2.0 million acres were placed in the ARP, 0.3 million in the Paid Land Diversion Program (PLD), 0.5 million in the 0-92 program, and 1.9 million enrolled in the long-term Conservation Reserve Program (CRP).

The 1988 barley crop is estimated at 288 million bushels, the smallest crop since 1953 and only 62 percent of projected use for 1988/89. The drought has caused high levels of abandonment, and significantly reduced yields are expected, with the greatest impact occurring in the major producing States in the Northern Plains. North Dakota, which accounted for 26 percent of production in 1987, is forecast to produce 43.7 million bushels this year compared with 139.2 million in 1987. North Dakota yields may drop from 48 to 23 bushels per harvested acre, and 73 percent of acres planted are expected to be harvested for grain compared with 97 percent in 1987/88. Similar situations are expected in Minnesota and Montana. The average yield for the United States is forecast at 38.9 bushels per acre compared with 52.6 last year and 51.9 over the previous 10 years. Only 7.4 million acres are forecast to be harvested for grain out of 9.7 million acres planted. This expected rate of 76 percent compares with a 10-year average of 92 percent of planted acres harvested for grain.

Beginning stocks for 1988/89 are 321 million bushels. Imports are expected to be 20 million. Total supply for 1988/89 is projected at 629 million bushels, 28 percent below a year earlier.

Total disappearance for 1988/89 is projected at 465 million bushels, down 90 million from 1987/88. Much of the decline will be from reduced exports. Projected exports for 1988/89 are 50 million bushels, compared with 126 million for 1987/88. Feed and residual use is forecast to decline 15

million bushels to 240 million. Feed barley prices were high relative to corn prices for the last 2 crop years, and feed and residual use declined an average of 38.8 million bushels per year during that period. From October 1986 to December 1987, prices received by farmers for feed barley were above corn. However, the price relationship from March has more closely reflected relative feeding values.

FSI use is projected about the same as in 1987/88. Barley quality may be a problem for maltsters this year. Hot, dry weather has resulted in higher than desired protein levels. There may even be a trend toward obtaining old crop feed varieties of barley from stocks as a substitute for this year's malting barley crop. Generic certificate exchanges may reflect this practice. Between mid-May and the last week in July, 58 million bushels had been redeemed with certificates, bringing the total to 248.5 million. Redemptions from FOR/Special Producer Storage Loans accounted for 31 million certificate exchanges since mid-May.

Ending stocks are projected at 164 million bushels, down more than 150 million from a year earlier. The projected ending stocks-to-use ratio is 35 percent--7 percentage points below the 42-percent average for the last 25 years and equal to the crop year following the 1983 drought.

Although barley prices generally were higher toward the end of the 1987/88 marketing year, the rise appeared to fit the normal seasonal pattern for months prior to the harvest season. The drought's impact on the 1988 crop appeared strongly at the beginning of the new crop year. Compared with May, preliminary July prices received by farmers for malting barley increased $1.60 to $3.41, and feed barley prices received rose 56 cents to $2.32. The season average price for all barley is projected between $2.50 and $2.90 for 1988/89.

Oats

Oats production in 1987 was 374 million bushels, beginning stocks were 133 million, and imports were 46 million for a total supply of 553 million bushels, 8 percent below the year-earlier level. Imports rose almost 40 percent for the year and were the highest since 1953. Imports in January-March were almost twice those of the previous year at 19.9 million bushels. In April and May, imports were 8.5 million bushels, 1.1 million above the year earlier.

Domestic oats use was 439 million bushels for 1987/88, 6 percent below a year earlier. Feed and residual use was down 9 percent at 360 million bushels, probably in response to lower supplies and continued high oats prices relative to corn. FSI use increased 6 million bushels to 79 million, while exports decreased 2 million bushels to 1 million. June 1, 1988, oats stocks were 112 million bushels, a 16-percent decline from the previous year. Free stocks were 106 million, and on June 1 only 2 million bushels were outstanding under loan. At current prices, all oats, including CCC and FOR stocks, are available to the market. The ending stocks-to-use ratio was 25.4 percent, the lowest since 1957 and 12 points below the previous 10-year average.

The average price received by farmers for 1987/88 was $1.56, 35 cents higher than the previous year. The simple average price for number 2 heavy white oats at Minneapolis was $1.92 for June 1987-May 1988, an increase of 46 cents over 1986/87. Prices received for oats have been higher relative to corn than would be supported by relative feeding values (0.5) since October 1986, and have been above 0.9 since November 1986 with the exception of July 1987 (0.8). The higher prices for 1987/88 generally reflect increasing food use and short supplies of better quality oats for food and industrial use.

Preliminary program enrollment for producers in 1988 indicates an increase to 50 from 30 percent in 1987. Although loan rates and target prices declined in 1988, and oats prices in the spring were higher than year-earlier levels, low ARP requirements (5 percent) may have attracted producers interested in relatively inexpensive price protection. Estimates for 1988 indicate 0.1 million acres were taken out of production to satisfy ARP requirements, 0.1 million acres were idled for the 0-92 program, and 1.2 million acres were committed to the long-term CRP. There was no PLD program for oats in 1988.

Oats production for 1988 is estimated at 206 million bushels, the lowest since records were begun in 1866, and 68 percent of

projected use for 1988/89. As with barley, the drought has reduced yields significantly. Area indicated for grain harvest is 5.4 million acres, the lowest on record, and yield is forecast at 38.4 bushels per acre--the lowest since 1959. Beginning stocks were reported at 112 million bushels. Imports are projected at 60 million bushels--a third higher than last year's level. Total supply is put at 378 million bushels, 32 percent below 1987/88.

Domestic use for 1988/89 is projected to be around 300 million bushels, a one-third decline from the previous year. Feed and residual use will account for most of the decline. A reduction in oats fed to livestock would be expected based on the high price relative to corn. However, oats fed to race and pleasure horses would not likely show much response even with higher prices, because corn does not easily substitute in rations for these animals.

Further tightening in stocks to 76 million bushels would imply an ending stocks-to-use ratio of 25.2 percent, slightly lower than 1987/88 and the lowest since 1956/57.

Oats prices received by farmers have followed a pattern similar to barley through the end of the crop year. Starting in July 1987, prices rose steadily through February, dropped in March, and then finished the year in May at $1.84, 28 cents above the season average. Monthly prices received increased 95 cents to $2.79 by July, reflecting the prospect of a poor crop, lower than expected June 1 stocks, and heavy bidding by processors. Prices for number 2 heavy oats at Minneapolis also have increased through the beginning of the new crop year. However, the preliminary June price of $2.36 was 31 cents below the price received by farmers. The season-average price for oats is anticipated between $2.30 and $2.70 for 1988/89.

Hay

Drought Reduces Hay Yield and Production

The drought that devastated feed grain crops this summer also affected hay production. However, because the first cutting of hay is in May, the drought has not had as severe an impact on hay yields as it had on corn. The average yield for alfalfa and alfalfa mixtures in the Northern Plains, Corn Belt, and Lake States was 2.2 short tons per acre, down 29 percent from last year's yield of 3.0 tons. In contrast, corn yields were estimated to be 34 percent below a year earlier.

The U.S. hay crop is estimated at 130.5 million tons, harvested from 66.2 million acres. This is 12.5 percent below 1987 production of 149.1 million tons from 60.7 million acres. Harvest of alfalfa and alfalfa mixtures is estimated at 69.5 million tons from an area of 25.7 million acres--a yield of 2.7 tons per acre. Last year, 84.6 million tons were harvested from an area of 25.5 million acres for a yield of 3.3 tons. Production of other hay is estimated at 61 million tons from 40.5 million acres for a yield of 1.5 tons per acre. The 1987 crop of other hay was 64.6 million tons harvested from 35.3 million acres, for a yield of 1.8 tons per acre. This year's forecast hay crop is 10 million tons less than harvested in 1983, and the smallest crop since the 1976 crop of 120.1 million tons.

Acreage harvested, as reported in the August *Crop Production* report, is almost 2.8 million acres more than the area indicated for harvest in the July report. Alfalfa hay area increased 1.2 million acres, and other hay increased 1.6 million tons. This increase likely reflects, in part, the emergency haying rules for conservation use and conservation reserve land under USDA's drought assistance measures.

Supply Barely Adequate

Beginning hay stocks (May 1) of 27.3 million tons bring the forecast total supply for the 1988/89 marketing year to 157.8 million tons, 13 percent below the year-earlier supply of 181.5 million. This year's supply will be the smallest since 1977/78's 151.7 million tons.

The number of roughage-consuming animal units (RCAUs) on hand for the 1988/89 hay crop year is estimated at 78.1 million, almost the same as last year. The hay supply per RCAU is 2.07 tons, compared with last year's supply of 2.32 tons. Disappearance last year amounted to 1.97 tons per RCAU. If disappearance per unit this year equals last year, total use will be almost 154 million tons, leaving ending stocks of only 3.8 million tons.

Roughage Consuming Animal Units and Hay Use

Crop Year	RCAUs	Hay supply	Total disap.	Disap. per RCAU
	Million	Million tons		Tons
1976/77	94.9	145.6	126.1	1.33
1977/78	89.6	151.7	127.5	1.42
1978/79	86.0	168.0	137.9	1.60
1979/80	87.6	177.4	144.6	1.65
1980/81	90.2	163.9	138.9	1.54
1981/82	91.4	167.9	143.4	1.56
1982/83	90.1	174.2	148.6	1.62
1983/84	89.3	168.9	148.8	1.67
1984/85	85.7	170.8	143.8	1.68
1985/86	83.1	175.5	148.8	1.79
1986/87	80.7	182.2	149.8	1.86
1987/88	78.4	181.5	154.2	1.97
1988/89	78.1	157.8		

This would be a record low for ending stocks. It would appear more reasonable that the rate of use will be something less than 1.97, with larger ending stocks.

Hay use will depend on a number of additional factors. Silage yields will be sharply reduced by the drought. However, the area of silage harvested likely will be increased because of abandonment of area intended for harvest as grain. More straw likely will be baled this year to stretch out forage supplies. Fall pasture growth, or lack thereof, and spring pasture conditions also will be important to hay use. Good fall rains and pasture, and good early spring pasture would help to ease the pressure on hay supplies. Converse conditions would intensify supply pressures.

Hay prices for 1988/89 will probably experience the steepest year–over–year rise to date. Since 1953, the steepest rise has occurred in 1980/81, when the average price received by farmers for all hay rose $11.60 per ton from the previous year. The price received by farmers averaged $80.90 a ton for May this year, $7.60 a ton above the year–earlier price. By July, the average price received had increased to $83.10 and was $21.50 a ton above the July 1987 price. Alfalfa hay averaged $88.10 a ton in July, and other hay averaged $68.70 a ton compared with $65.70 and $50.00, respectively, a year earlier.

FEED DEMAND

Drought in the growing season raises prices during the marketing year (usually beginning with the harvest season) and encourages lower concentrate feeding. In the drought years of 1970, 1974, 1980, and 1983, concentrates fed per GCAU declined 4, 12, 7, and 9 percent, respectively, from the year before. GCAUs also fell from the previous year in all years except 1970. Effects of the drought show up before harvest and the beginning of the marketing year, and result in feed prices increasing in the pre–drought crop year.

Feeders, responding to higher feed costs and declining net returns, begin adjusting plans in the pre–drought year; and by the drought marketing year, livestock numbers (as measured by GCAUs) are down. In 1988/89, GCAU's are likely to be less than 1 percent below last year. This reduction would be less than the declines in 1983 and 1980 of 1 and 2 percent, respectively.

Feed and residual use of the four feed grains in 1988/89 is expected to equal 132.8 million metric tons, down from 142.1 million projected for 1987/88. Higher prices are expected to encourage more efficient feed use, thus reducing disappearance much more than the decline in GCAUs would suggest. With higher feed prices, feeders will likely cut waste, feed less intensively, and process grains for better utilization despite the cost.

Feed use by the dairy industry in 1988/89 is expected to decline because of fewer cows and possibly higher prices for both concentrates and forage. In much of 1987/88, producers compensated for fewer cows by increasing concentrate feeding to boost milk production. Lower milk prices in calendar year 1988 slowed year–to–year gains in the first half, and higher feed costs will provide further pressure in the second half. However, the small alfalfa hay crop may force the feeding of low quality forage, which would require more concentrates to balance the ration.

In 1988/89, low returns will likely keep cow numbers below a year earlier, and

replacement heifer numbers are also likely to be lower. It is doubtful that changes in dairy price supports contained in the drought relief bill will stimulate high concentrate feeding to boost milk output per cow.

Cattle on feed numbers in 1988/89 may decline 5 percent from last year. Cattle inventories are expected to level out in 1989/90, but widespread drought may slow the pace of herd rebuilding. Larger numbers of heifers are expected to be retained rather than placed on feed. The higher feed prices will discourage feeders from adding extra weight in the feedlot. Additional concentrates could be used by cattle feeders next year, if forage is short enough to force many lightweight calves into the feedlots. However, in much of the cow–calf production area the drought has not been as bad as elsewhere.

The drought is expected to reduce hog production. Feeder pig producers, already hit with higher feed prices, are realizing lower sale prices for their stock. They are expected to cut short the increase in breeding herds. This would reduce pork output in 1989, probably late in the year. Another factor that may cut pork production is hot weather during the summer breeding season, which may reduce the fall pig crop if farmers have not kept extra gilts. The lower returns are expected to reduce the pig crop, especially from December 1988 to May 1989. Feed demand from the hog sector, driven by increases in pig crops in 1988, is expected to be up slightly in 1988/89.

Feed demand from the poultry sector is expected to increase. Egg producers are likely to reduce numbers in 1988/89, thus lowering feed demand. But broiler and turkey producers are likely to boost production in 1989, increasing feed demand. Since broilers are the most feed efficient and have the shortest response time to economic factors, cutbacks in other meats and subsequent price increases may encourage more broiler production. This may boost GCAUs for poultry in 1988/89.

Feed Units by State

The feed units needed by State were estimated for 1987/88 and 1988/89. The State estimates rely on NASS figures for the number of animals in the annual inventories for the beginning of 1988. Where States were combined in the livestock inventory, the estimate of feed unit needs per State used the average for the combined States. The estimates for 1988/89 are based on expected livestock and poultry production, and assume that State distribution remains the same as in 1987/88. Feed units were computed from GCAU and RCAU, and use conversion factors developed from base feeding activity in 1969–72. A feed unit is defined as the equivalent of a pound of corn containing 78.6 percent total digestible nutrients, and is used to convert all feeds to a corn equivalent.

Feed units by State

States	Grain		Roughage		Grain & roughage	
	1987/88	1988/89	1987/88	1988/89	1987/88	1988/89
	Billion units					
Ala.	8.65	8.82	9.17	9.07	17.82	17.89
Alaska	0.03	0.02	0.07	0.07	0.10	0.09
Ariz.	3.24	3.14	4.44	4.45	7.68	7.59
Ark.	12.83	13.00	10.73	10.61	23.56	23.62
Calif.	16.17	16.07	26.23	26.07	42.40	42.14
Colo.	8.10	7.87	11.82	11.85	19.92	19.71
Conn.	0.72	0.71	0.55	0.53	1.27	1.24
Del.	2.15	2.20	0.31	0.30	2.46	2.50
Fla.	3.98	3.98	10.78	10.67	14.76	14.64
Ga.	11.57	11.74	9.82	9.71	21.39	21.45
Hawaii	0.42	0.41	1.04	1.03	1.47	1.44
Idaho	2.69	2.64	8.30	8.26	11.00	10.90
Ill.	13.90	14.48	19.12	18.97	33.01	33.45
Ind.	13.27	12.92	13.50	13.24	26.77	26.16
Iowa	30.59	30.29	43.47	42.81	74.06	73.10
Kans.	13.59	13.29	26.85	26.73	40.44	40.02
Ky.	3.73	3.73	14.77	14.60	18.50	18.33
La.	1.31	1.31	6.12	6.06	1.43	7.36
Maine	1.12	1.12	0.77	0.76	1.89	1.88
Md.	3.88	3.88	2.34	2.30	6.22	6.18
Mass.	0.34	0.34	0.54	0.53	0.88	0.86
Mich.	6.13	5.89	8.18	8.06	14.32	13.95
Minn.	17.89	17.76	22.89	22.58	40.78	40.34
Miss.	4.87	4.96	7.50	7.42	12.37	12.38
Mo.	10.12	10.06	27.01	26.67	37.13	36.73
Mont.	1.84	1.82	12.95	12.84	14.79	14.66
Nebr.	21.46	20.98	26.31	26.21	47.78	47.19
Nev.	0.45	0.44	2.67	2.65	3.11	3.09
N.H.	0.17	0.16	0.38	0.36	0.55	0.52
N.J.	0.46	0.46	0.65	0.64	1.11	1.10
N.Mex.	1.88	1.85	7.05	7.02	8.94	8.87
N.Y.	5.10	4.91	10.89	10.72	15.98	15.63
N.C.	14.21	14.28	8.79	8.64	23.00	22.92
N.Dak.	1.97	1.92	10.22	10.10	12.18	12.02
Ohio	9.33	9.27	13.45	13.30	22.77	22.58
Okla.	5.70	5.68	25.36	25.15	31.06	30.83
Oreg.	2.25	2.22	7.80	7.75	10.05	9.97
Pa.	9.22	9.20	12.94	12.79	22.15	21.99
R.I.	0.05	0.05	0.05	0.05	0.10	0.10
S.C.	2.64	2.61	3.80	3.75	6.44	6.36
S.Dak.	7.04	7.14	20.60	20.44	27.64	27.57
Tenn.	4.08	4.07	13.39	13.24	17.48	17.31
Tex.	24.63	24.01	66.66	66.47	91.30	90.48
Utah	1.42	1.40	4.63	4.61	6.05	6.02
Vt.	0.88	0.85	1.93	1.90	2.81	2.76
Va.	5.02	5.09	9.81	9.72	14.83	14.81
Wash.	3.51	3.45	6.68	6.64	10.19	10.09
W.Va.	0.88	0.88	2.76	2.73	3.63	3.61
Wis.	13.17	12.99	27.66	27.30	40.84	40.29
Wyo.	1.19	1.17	7.43	7.41	8.63	8.58
U.S.	329.83	327.49	591.16	585.78	920.99	913.27

FOOD, SEED, AND INDUSTRIAL USE OF CORN

FSI use of corn is estimated at 1,224 million bushels for 1987/88. This is 2.7 percent above year-earlier use, equal to the growth rate for 1986/87, but less than the rates seen from 1980-85. Declining growth rates for high fructose corn syrup (HFCS) and ethanol production are behind the slower increases in FSI use of the past 2 years.

Estimated corn disappearance for 1987/88 by category of use appears in the table. Glucose and dextrose, and dry-milled and alkaline cooked products are expected to show small increases compared with 1986/87. Moderate increases are likely for HFCS and starch. Seed use is up 1 million bushels to 17 million.

Third-quarter (March-May) food and industrial use was 313 million bushels, less than 1 percent above the third quarter for 1986/87. For the quarter, HFCS production increased to 95.4 million bushels--almost 5 percent above the year-earlier level. Production of HFCS-42, used to sweeten bakery goods, dairy products, and cereals, increased 18 percent over March-May 1987, while HFCS-55, used primarily as a sweetener in soft drinks, was held to a 1-percent increase. HFCS-55 accounted for 63 percent of corn sweetener production in 1986/87.

Seasonal demand for carbonated beverages boosted production of HFCS in June and July. Fourth-quarter use may increase compared with the final quarter of 1986/87 due to the dry, hot weather this year. Supplies of HFCS-55 have been tight, and there have been reports of bottlers substituting small amounts of HFCS-42.

HFCS prices have increased since February, reflecting seasonal demand and relatively tight supplies. HFCS-42 prices at Midwest delivery points averaged 15 cents per pound in July, up 7 cents from February. July prices for HFCS-55 were 18 cents, up 7 cents over the same period. July 1988 prices were about 3 cents higher than a year ago, reflecting sharply increasing corn prices beginning in June.

Glucose and dextrose producers used 48 million bushels of corn during the third quarter of 1987/88, up 1.8 million over 1986/87. Prices for Midwest delivery points averaged 22 cents per pound, a 1-cent increase over the same quarter last year.

Starch production through the end of third-quarter 1987/88 was 6.8 percent higher than for the same period in 1986/87. Most of the increase occurred during the third quarter, with production through February unchanged from the previous year. Starch prices began the year at 10 cents per pound at Midwest delivery points and strengthened as use picked up in March. By July, the price had increased to 12.9 cents per pound. The season average price will likely be near 11 cents per pound, compared with 9.5 cents for 1986/87.

Beverage and fuel alcohol production used about 85 million bushels of corn in the third quarter, unchanged from a year earlier. Corn used for ethanol during the first quarter of 1987/88 was about 7 percent higher than for the comparable quarter in 1986/87, but by the third quarter the rate of use was below that of a year earlier. Estimated fourth-quarter use is somewhat lower than in June-August 1987 due to higher corn prices, combined with flat ethanol and petroleum prices. At least five relatively small ethanol plants have stopped production in the last few months.

Outlook for 1988/89

FSI corn use is projected at 1,210 million bushels for 1988/89. Higher corn prices will limit use somewhat, although many of the products in the FSI use category are highly processed, so response may be moderate.

With ending stocks of corn projected below 2 billion bushels for 1988/89, the ARP for the 1989 crop cannot exceed 12.5 percent. Reduced ARP requirements and higher prices will lead to increased planted acreage in 1989. Also, seed use is projected up. One bushel of corn seeds approximately 4 acres.

Corn use for HFCS production will likely increase about 3 percent to 366 million bushels. Production this year will depend on corn prices. An increase in the sugar quota will have little effect on demand for HFCS. Some soft drink producers were rumored in June to be considering a switch away from HFCS in response to higher corn prices. Such

Corn: Food, seed, and industrial use 1/

Year beginning September 1	HFCS	Wet-milled products: Glucose and dextrose	Wet-milled products: Starch	Wet-milled products: Alcohol	Dry-milled alcohol	Dry-milled and alkaline cooked products	Seed	Total
				Million bushels				
1975	45	162	116	5	20	154	20	522
1976	62	164	116	10	15	155	20	542
1977	80	170	124	10	20	158	20	582
1978	105	170	124	15	20	155	20	609
1979	127	170	120	25	20	158	20	640
1980	165	183	120	35	35	160	20	718
1981	185	183	130	83	35	162	19	797
1982	215	188	127	130	50	170	15	895
1983	256	189	147	150	50	164	19	975
1984	310	187	143	170	100	160	21	1,091
1985	328	188	152	185	127	161	19	1,160
1986	339	185	155	200	135	161	16	1,191
1987 2/	355	188	165	200	136	163	17	1,224
1988 3/	366	190	172	180	120	164	19	1,210

1/ Data are estimates based on production and sales figures from Government and private industry.
2/ Preliminary. 3/ Projected.

shifts are unlikely. Glucose and dextrose production is projected to require 190 million bushels of corn--a 2-million increase from 1987/88.

Industrial and food use of starch is likely to remain strong in 1988/89. Projected use of 172 million bushels is about 4 percent above 1987/88. Dry-milled and alkaline cooked products are projected to use 164 million bushels in 1988/89.

Higher corn prices and competition from petroleum prices will likely reduce fuel alcohol production for 1988/89. Projected corn use for 1988/89 ethanol production is around 270 million bushels, a decline of some 30 million from 1987/88. Corn price level changes could significantly change this estimate. Beverage alcohol producers are projected to use 35 million bushels, down 5 million from 1987/88.

TRANSPORTATION

Grain Transportation Under Stress

Drought and high demand are straining the U.S. grain transportation system. Barges, river elevators, and ports on the Great Lakes have had their capacity reduced by low water. Record demand for rail and truck service is likely to exceed capacity. And shippers face sharply increased transportation costs.

Barge Capacity Greatly Reduced

In mid-June, low water levels on the lower Mississippi and Ohio Rivers began to halt barge traffic at choke points for more than a day. By the end of the month, stoppages were a daily occurrence.

Water depth at the mouth of the Ohio in mid-June was 17 feet below normal. At Memphis, the water was 12 feet below normal. Channel widths were reduced from 500 to 200 feet, which decreased the number of barges that could be towed abreast and increased the number of bends at which tows must be disassembled to proceed. Since June, rains have intermittently lifted the rivers' levels, but continuing drought has caused the water to fall again. Usual river depth measurements have become meaningless and navigation channels are kept open by constant dredging. At Memphis, in early August, the Mississippi's flow was 46 percent of normal for this time of year.

To continue service, in June barge operators reduced individual barge loads by 10 percent. Some operators reduced the number of barges in a tow by 25–30 percent. Others retained tow sizes, but encountered lengthy delays as tows were broken up to navigate bends in the river.

Usually, tows of 30–50 barges are common on the lower Mississippi. To maintain safe navigation, the U.S. Coast Guard has restricted tows to as few as 16 barges and restricted drafts to 8.5 feet from the usual 9 feet.

Reduced load size, smaller tows, and lengthened transit times have dropped the capacity of the Mississippi River system by at least 50 percent. Difficult navigation and increased travel time add to costs, especially for fuel and labor, which normally account for about 35 percent of total operating costs. A recent study sponsored by the American Waterways Operators indicates that the barge industry could lose as much as $200 million this year.

Barge Rates Soar

Because of an 8–percent increase in demand this year, barge rates averaged (Jan–May) 23–24 percent above 1987. In the first 2 weeks of June, rates rose 4 percent from the end of May. By the end of June, rates had nearly tripled. This increase was short lived. In the first week of July, rates fell to about 125 percent above the end of May, and by month's end had returned to pre–drought levels. In the first week of August, rates from Peoria to New Orleans averaged $6.85 per ton, 12 percent above the same week in 1987. At St Louis, rates averaged $5.89 per ton, up 26 percent from May 1987.

The decline in rates after the first week of July resulted from a sharp reduction in demand for barge service. As export volume shrank and producers held stocks in anticipation of higher prices, shipments of grain and soybeans in June fell 16 percent from May, and in July dropped 37 percent from May.

Higher transportation costs and reduced capacity substantially increased barge–delivered corn prices at the Louisiana Gulf ports. Between June 17 and June 23, prices rose from $3.31–$3.32 per bushel to $3.63–$3.66. These ports account for about 50 percent of U.S. grain exports and receive 70 percent of the grain, chiefly corn, by barge. Similar price increases are anticipated in the poultry–producing areas of the Southeast. Barges normally carry about a third of the grain shipped to these States.

Port Facilities Hampered

Falling water levels will prevent some river elevators from loading barges even to the reduced drafts. Moreover, the Great Lakes are now 4–16 inches below 1987 levels. The Vidal Shoals between Lakes Superior and Huron are critical. Here, low water has cost a foot of draft for the already relatively small ocean vessels serving the Great Lakes. A foot of draft represents about 3,500 tons of cargo. Ocean–going vessels serving the lakes average about half the capacity of those docking at the Gulf, and rates are about twice as high. Although some export traffic is expected to be diverted to Great Lakes and Atlantic ports, higher rail and ocean rates will limit the diversion.

Trucks Are Not an Alternative

A fully loaded barge holds 1,500 tons of grain, about 35 truck loads. Bumper–to–bumper, a mile–long truck convoy would replace about 2–1/3 barges. On one day, 1,760 barges were stacked above Greenville, MS, 287 miles from New Orleans. Grain in these barges would have filled a line of trucks 755 miles long. Trucks are not a viable substitute for the reduced barge capacity.

Rail Car Demand a Record

From May to June 1987, rail car loadings of grain rose 23 percent to 32,150 cars per week, approaching the November 1979 record of 32,558 cars. The old record was exceeded in October, and in March 1988, reached 34,240 cars. Many shippers experienced delays of 2 weeks or more. The Association of American Railroads said there was an average daily shortage of 8,000 cars in April.

The tight car supply seemed likely to continue throughout 1988, even before river

traffic slowed. In view of the large grain disappearance anticipated this year, 291 million metric tons, demand for rail service promises to remain high. Total demand for rail car loadings in 1988 is estimated at 1.7 million cars, 10 percent above 1987.

Part of the problem lies in the availability of jumbo covered hopper cars. These each carry about 96 tons of grain and are the predominant vehicle for rail shipments of grains and oilseeds. This fleet rose from 186,000 to 239,000 cars in 1980–86, but increases were small in the later years. Scrapping of overage and damaged cars reduced the fleet to 236,000 by 1988.

Nearly half the jumbo cars are owned by non–railroad firms. Many are under the control of grain–marketing firms. Only 2,000 jumbo grain cars are on order, and delivery will begin in September 1988. Long–term supply prospects are no more optimistic. During most of the 1980's, railroads held a large surplus of cars. Numerous rail spokespersons have indicated unwillingness to increase their fleets when continuance of record demand is in doubt.

The number of covered hopper cars is but one factor in rail car supply. For a given shipment, the demand for cars is best measured in car days, the number of cars needed times the number of days required to complete the shipment and return the cars for loading. The quantity of tractive power (the number of locomotives needed to pull a train and the time required to make a roundtrip) is also a factor.

Increased Exports a Factor

Much of the expected increase in demand for rail cars results from larger grain exports. During the first 6 months of 1988, 316,500 cars of grain were delivered to Atlantic, Gulf, and Pacific Coast ports, a 44–percent increase from the same period of 1987. (Data for rail shipments to the Great Lakes are not available.) In 1987, exports accounted for 26 percent of railed grain. In 1988, the share is expected to jump to 37 percent.

Car supply could be increased if the time spent unloading at ports was reduced. However, such gains may have already been realized. In the first 6 months of 1987, 74 percent of all cars delivered to a port were unloaded within 7 days. During the same period this year, 80 percent of all grain cars were unloaded within 7 days, despite the increase in arrivals at ports.

In 1986, each hopper car was loaded slightly more than five times per year. In 1987, loadings increased to more than six per year. Further major improvement in car utilization appears unlikely.

Distribution Patterns Have Shifted

In recent years, favorable rates became available for shipments of wheat and corn from Kansas and Nebraska to the Pacific Northwest ports. These rates, combined with relatively low ocean rates from the Pacific Northwest to major Asian markets, resulted in substantial flows of corn and wheat from Kansas and Nebraska to Puget Sound and Columbia River ports. Such shipments consume more car days and tractive power than do similar shipments from Oklahoma and Texas to the Texas ports. North Platte, NE, is 1,400 miles from Portland, three times farther than Oklahoma City is from Houston.

The northwest trip consumes more car days and more locomotive days. Moreover, the route to the Pacific Northwest passes through mountainous terrain, which requires increased tractive power.

Rail unloadings of grain at Pacific Coast ports increased 35 percent to 141,000 cars between 1986 and 1987. This year 196,000 cars are estimated to be unloaded at these ports, 39 percent above 1987.

Estimates made before the river stoppages began indicated that nearly 1.7 million carloads of grain would be required to meet 1988 needs for exports and domestic use of grain. Given current distribution patterns only about 1.4 million car loadings are expected. It is likely that the rail car shortage will continue. Some grain has been shifted from barge to rail. In June, grain unloadings increased 38 percent at North Atlantic ports and 8 percent at the South Atlantic and Gulf ports. Preliminary indications are that rail–delivered volume remained high in July. These shifts are expected to continue so long as the drought

severely impares river navigation. Larger shifts, however, seem unlikely because of rail car congestion at the North Atlantic, South Atlantic, and Gulf ports.

The shifts from barge to rail service were countered by a reduction in rail shipments to the Pacific ports, so the car shortage did not intensify. While 159,000 cars of grains were loaded in June, up 25 percent from May, deliveries to the Pacific ports fell 18 percent. The disproportionate reduction in car days curtailed demand for rail service.

Rail Rates To Rise

The Burlington Northern (BN) system announced a series of increases in its Certificate of Transportation program. Under this program, shippers of wheat and feed grains bid for rail cars. Minimum rates are set for various routes and grains at each session. BN announced that the June 23 rate minimums would increase on the first of August, September, October, and December 1988. By September, rates for wheat from the Upper Great Plains to interior points such as Springfield and St Louis may rise 27–29 percent. By December some rates may increase as much as 83 percent. Similar increases can be expected for other railroads.

WORLD COARSE GRAIN OUTLOOK

Global supplies of coarse grains are expected to be relatively large in 1988/89 despite drought–reduced crops in the United States and Canada. High production elsewhere and large carryin stocks should ensure that there is no world shortfall. The principal impact of the North American drought on the world market will be higher prices. This is likely to lead to some tempering of import demand and to some additional shifts in market shares among exporters.

Southern Hemisphere competitors--mainly Argentina and South Africa--will be able to expand production in response to these price signals. Their planting of corn and sorghum begins in the next few weeks. For the most part, the other important competitors had already planted by the time the drought damage became evident. But most should have good harvests and are expected to increase exports.

Weather Concerns Center on North America

Several weather problems outside of North America have been reported so far in the 1988/89 crop year. However, poor crops in the United States will have the greatest impact on global coarse grain production. Probably the most severe drought damage anywhere has occurred in Tunisia, which has led to disastrous wheat and barley crops. Production of the latter is forecast at just 54,000 tons, down from 537,000 in 1987/88 and the lowest in 2 decades.

Much of the attention elsewhere focuses on China, where heat and dryness have been problems in some provinces, along with pockets of flooding. This is expected to cause much greater damage to rice than coarse grains, however. Relatively small amounts of corn and other coarse grains are produced in the problem areas, and conditions in more important corn areas appear better.

Portions of Eastern Europe have suffered from unfavorable weather this summer. Hot and dry conditions in Yugoslavia and Bulgaria have harmed crops, especially corn. Some weather damage has also been reported in Poland, East Germany, and Hungary. Despite this deterioration, Eastern Europe's coarse grain production is still forecast 5 percent higher than 1987/88.

Very dry weather in parts of Argentina in recent months has delayed planting and development of winter grains, mainly wheat. It is not clear if production of oats and barley, the winter season coarse grains, will be reduced.

Like the United States, Canada has been hurt severely by drought. Coarse grain production is likely to decline 23 percent from last year, mainly due to a drop in barley and corn. The decrease in the barley crop is related to lower plantings as well as to drought damage. Barley has fared somewhat better than wheat this season, however. Much of the barley is grown in Alberta, where conditions have been better than in Saskatchewan and Manitoba, where more wheat is produced. Weather problems there have been similar to those in the U.S. Northern Plains States that have decimated spring wheat crops. Oats, which are grown

farther north in Canada, may have largely escaped the poor weather.

In Mexico, there were some concerns about dryness earlier in the summer in the central corn and sorghum growing areas. But rainfall since then has dissipated these fears. Reservoir levels are generally low but this is more critical for other irrigated crops. Mexico's coarse grain output is forecast up about 3 percent for 1988/89.

Overall Foreign Outlook Remains Favorable

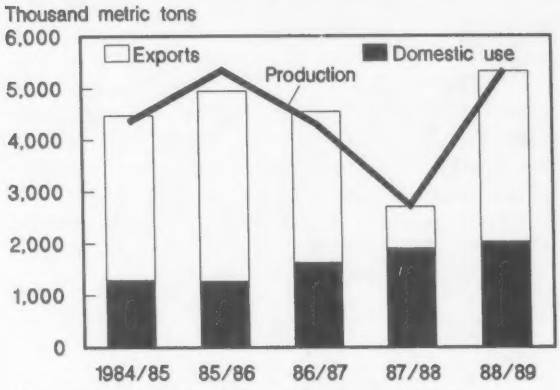
For 1988/89, total foreign production of coarse grains is forecast at 580 million tons, up 1 percent over 1987/88. Although this estimate has been lowered 4 million tons since the initial projection in May, it is still very close to the 1986/87 record. Corn and sorghum are expected to be up over 1987/88 while barley and rye fall. Oats are about unchanged. Large declines projected for coarse grains in Canada, the USSR, and China are more than offset by gains in other important producing areas.

The biggest gains are anticipated in India, where the monsoon has been favorable so far. Coarse grain production is forecast up nearly 7 million tons to 29.8 million. This would be the largest harvest since 1984/85. Nearly all of this increase will probably be consumed domestically, however, and India's stocks are projected to remain low.

Thailand is also making a strong recovery from poor harvests in 1987. With an excellent growing season to date and increased use of improved seed, a record corn yield is expected. Thailand's corn production for 1988/89 is forecast to triple to 5.4 million tons, matching the record of 1985/86. Most of this additional supply will be exported.

The 1988/89 crop season has been generally favorable in Western Europe and sizable gains are forecast. EC coarse grain output is projected up 4 million tons. About half of this increase is accounted for by barley in Spain, which is expecting a record outturn. While EC corn production is forecast to increase only 2 percent in 1988/89 to 26.2 million tons, this would be enough to eclipse the previous record.

Thailand's Corn Exports To Rebound



1987/88 preliminary, 1988/89 forecast. Based on local marketing year.

Coarse grain production in other Western European countries is forecast up 15 percent, led by improved crops in Scandinavia. Most of the increase will be in barley and oats. Australia's output for 1988/89 should rise 15 percent. All of the individual coarse grains are expected to increase in Australia, with oats rising to a near record. Both domestic and export demand for Australia's oats is strong.

A significant decline is forecast for the Soviet Union's 1988/89 coarse grain crop, down 8 percent to 105 million tons. But this is coming off a near record and would represent the fifth highest reported output. The corn crop is projected to rise 11 percent to 16.5 million tons, the second highest on record. Most of the decline is expected in spring barley due to lower area and yields. Hotter and drier conditions than normal in the New Lands have generally reduced prospects for most spring grains.

Argentina has not yet planted its 1988/89 corn and sorghum crops, but increases in area planted are expected. The corn crop is anticipated up 11 percent and sorghum up 17 percent. Farmers in Argentina are very sensitive to world price movements. However, quantifying their exact response to higher prices is difficult because area planted to oilseeds is also likely to rise with strong soybean prices.

Drawdown in Stocks Will Support Consumption

Global utilization of coarse grains in 1988/89 is forecast at 803 million tons, just slightly below 1987/88 and down less than 1 percent from the record of 1986/87. For the second consecutive year, global use will exceed production, but by a much greater margin than in 1987/88. This will lead to a record drawdown in world stocks, forecast at 85 million tons compared to the previous record drop of 70 million during 1983/84. Both U.S. and foreign ending stocks are projected to be the lowest since 1983/84. The ratio of world ending stocks to use will also decline to the lowest since 1983/84, at a forecast 15.9 percent. This is well below an estimated 26.4 percent for 1987/88, but above the 14.6 percent of 1983/84.

While this anticipated stock reduction is very large, world carryin stocks for 1988/89 are forecast to be the second highest ever at 213 million tons. Nearly all of the adjustments are expected in the United States, and foreign supplies will be more stable. Foreign utilization is forecast to increase 5 million tons to a record 634 million, supported by high foreign production and a 9–percent drawdown in stocks. Nearly half of this stock change is expected in Canada.

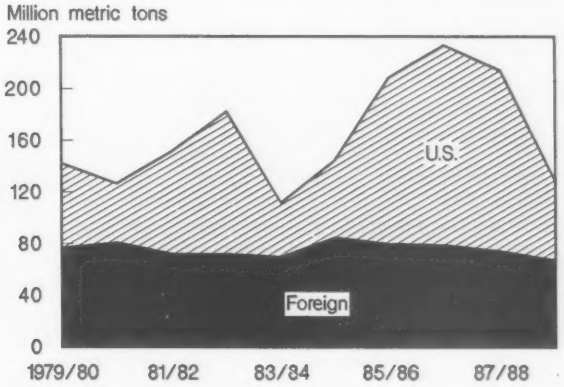
If the United States experiences normal weather in 1989/90, production should rebound dramatically because of a likely increase in area planted. This would result in a sizeable recovery of global supplies, similar to what happened following 1983/84, the most recent year of abnormally low global output. World production rebounded sharply in 1984/85, led by a major increase in U.S. output. World stocks also increased that year, although not as sharply as production, because of both U.S. and foreign gains.

Higher Prices Mark Trade Outlook

U.S. grain prices began a dramatic rise in June when drought fears became widespread. Export prices for U.S. corn (f.o.b. Gulf), for example, jumped from $92 per metric ton at the beginning of June to over $140 by the month's end, averaging $118. By mid–July, prices began to moderate but have remained well above last year. The average of $130 for July 1988 was nearly 70 percent higher than in July 1987.

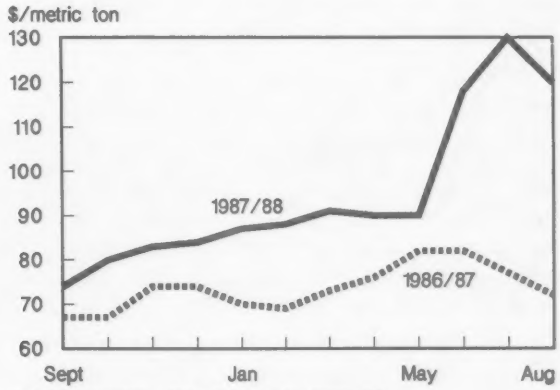
U.S. coarse grain export prices for 1988/89 will stay above last year's. The average f.o.b. Gulf price for corn could reach the $105–125 range per ton, assuming a margin of $15–20 over projected farm prices. Competitor prices are following U.S. prices up. Argentina reportedly cancelled some export contracts for corn this summer in order to take advantage of higher international prices. The average export price of Argentine corn (f.o.b. Buenos Aires) rose from $79 per ton in May to $121 in June. Canada has made substantial increases in its initial payments to grain farmers for 1988/89, based on anticipated selling prices by the Canadian Wheat Board. These include an 85–percent

World Coarse Grain Ending Stocks



1987/88 and 1988/89 forecast.

U.S. Corn Export Prices



F.o.b. Gulf, #3 yellow. Only partial data for August 1988.

boost for feed barley (#1 Canada Western) from C$65 to C$120 per metric ton and a 78-percent increase for oats (#3 Canada Western) from C$90 to C$160.

World coarse grain trade for 1988/89 is projected at 84.9 million tons, down slightly from the pre-drought projection, but still 3 percent above 1987/88. 1/ This assumes some buyers--primarily poorer, cash-strapped countries--will react to higher prices by cutting imports slightly or foregoing increases in imports. And, while no dramatic changes in the overall volume of trade is likely, there will be shifts in market shares. The United States will lose some sales to other suppliers who can offer more attractive prices. Prior to the drought, the United States was already forecast to lose some market share because of increased competitor supplies.

There is reason to expect that higher prices may not depress trade that much in 1988/89, based on recent trade patterns. Even with low prices in the last 2 years, trade in coarse grains has been flat. For 1987/88, the forecast level of 82.7 million tons represents the lowest amount in 12 years. This points to the importance of non-price factors in shaping import decisions.

High domestic production in several major importing countries is a common cause of lower imports. For example, Brazil's record harvest in 1986/87 enabled it to stop corn imports for 1987/88. Even more important for the world market has been the Soviet Union's relatively low imports in the last 3 years, after good domestic crops. Also contributing to the moderate level of Soviet coarse grain purchases have been sizeable imports of feed quality wheat in this period.

Domestic policy shifts are another influence on import levels. Most striking has been the case of Saudi Arabia, whose forecast imports (mainly of barley) for 1987/88 are down nearly 4 million tons after reductions in subsidies. Stagnant or falling demand for meat and livestock products has curtailed imports of feed grains in many cases, such as in Mexico and the EC. In Mexico, this is related to poor economic growth and depressed consumer purchasing power. In the EC, continued high use of non-grain feeds and feed wheat also accounts for a decline in imports in recent years. Shortages of foreign exchange and large debt burdens have frequently constrained many countries' ability to react to attractive prices. The availability of credit may be more of an incentive to import in some cases than a favorable price.

World coarse grain trade: Major exporters and importers, by commodity, 1985/86-1988/89

Country	1985/86*	1986/87	1987/88 (forecast)	1988/89 (forecast)
	Million metric tons			
CORN				
Exporters				
U.S.	31.5	39.4	43.8	42.0
Argentina	7.4	4.0	4.2	4.7
China	6.4	3.8	3.1	3.0
Thailand	3.8	2.5	0.9	3.3
South Africa	1.5	2.6	0.7	1.0
Others	3.9	4.1	3.1	3.2
Total	54.5	56.2	55.8	57.2
Importers				
Japan	14.6	16.1	17.1	17.6
USSR	10.3	7.6	7.8	7.3
EC-12	4.8	2.8	3.0	3.0
Korea, Rep.	3.6	4.6	5.1	5.6
Taiwan	3.1	3.5	4.4	4.0
Mexico	1.7	3.4	3.0	3.5
China	0.4	1.6	0.3	0.2
Eastern Europe	2.2	1.7	2.2	1.7
Egypt	1.9	2.4	1.5	1.5
Others	11.9	12.5	11.4	12.8
Total	54.5	56.2	55.8	57.2
SORGHUM				
Exporters				
U.S.	4.1	5.1	5.8	5.3
Argentina	2.2	1.0	1.0	1.1
Australia	1.1	0.6	0.7	1.0
Others	1.3	1.3	0.5	0.5
Total	8.7	8.0	7.9	7.9
Importers				
Japan	5.1	4.2	4.0	3.9
Mexico	0.6	0.8	0.7	0.9
Taiwan	0.8	0.8	0.3	0.7
Venezuela	0.8	0.8	1.6	1.4
Israel	0.5	0.2	0.4	0.4
Others	0.9	1.2	0.9	0.6
Total	8.7	8.0	7.9	7.9
BARLEY				
Exporters				
EC-12	7.3	6.2	7.0	8.0
Canada	4.8	6.0	4.3	4.4
Australia	3.7	2.2	2.1	2.3
U.S.	0.8	3.0	2.7	1.7
Others	1.9	1.2	0.8	1.0
Total	18.4	18.5	17.0	17.4
Importers				
Saudi Arabia	6.6	9.0	5.3	6.0
USSR	2.9	3.0	2.3	2.5
Eastern Europe	3.3	1.3	1.6	1.4
Japan	1.5	1.2	1.2	1.2
Others	4.1	4.0	6.6	6.3
Total	18.4	18.5	17.0	17.4
TOTAL COARSE GRAINS TRADE	83.2	83.9	82.7	84.9

*October-September year.

1/ All trade years referred to in this section are October-September and exclude intra-EC trade unless otherwise specified.

Competitor Market Share To Increase

For 1988/89, competing coarse grain exporters are forecast to gain at the expense of the United States. The U.S. share of the world market could fall to 58 percent compared to 63 percent for 1987/88. In East Asia, where import demand is forecast to continue strong, Thailand's corn exports will make a strong recovery. In addition to recapturing traditional markets, such as Malaysia and Singapore, Thailand could make inroads into American-dominated markets such as Taiwan and Japan. Both of these countries may relax aflatoxin regulations slightly to allow the import of Thai corn. Argentina will also increase corn and sorghum exports in 1988/89, but the extent of the increase will mainly depend on the size of its upcoming crops.

Despite lower production, Canada may maintain its barley exports at over 4 million tons in 1988/89 by drawing down stocks. The most significant increase in barley exports is projected for the EC, up 1 million tons to 8 million for 1988/89. Higher export prices will lower EC restitution payments needed to make up the difference between high domestic prices and lower world prices.

An interesting development in the barley market has been the emergence of Morocco as an exporter in late 1987/88. With large stocks and an excellent crop, Morocco has reportedly exported about 250,000 tons to the Middle East and North Africa thus far. With continuation of favorable prices, Morocco will likely continue exports in 1988/89 if its supplies are large enough.

Impact of Previous Droughts on Trade Has Been Mixed

The effects of previous U.S. droughts on world trade patterns have been mixed. During the last serious drought year, 1983/84, prices rose substantially, both because of the drought and the PIK program reductions in area. However, both world trade and U.S. exports increased by 4 and 7 percent, respectively. One critical factor underlying the U.S. export gains in that year was serious drought in South Africa, which switched from being a corn exporter to an importer. The United States exported nearly 3 million tons of corn to South Africa and picked up additional sales that South Africa would have made, particularly to Japan.

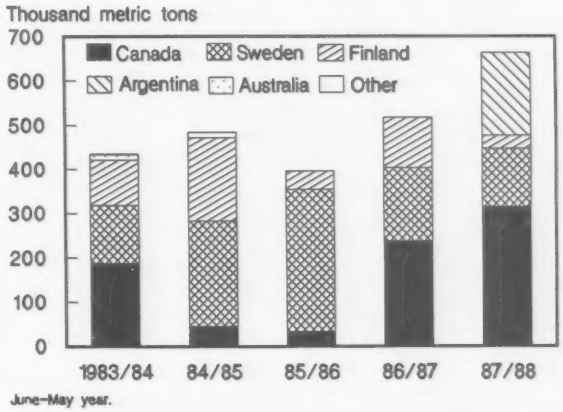
A drought-related price rise also occurred in 1980/81 in the United States. However, this coincided with buoyant import demand, and coarse grain trade actually reached its all-time high that year at 108 million tons, increasing 9 percent from the year before. U.S. exports were down only fractionally. Other exporters, led by Argentina, picked up the increase in total trade. At high prevailing prices, Argentina's production and exports set records in 1980/81, while smaller gains in exports were recorded by Canada and South Africa.

Finally, looking back to one other drought year, 1974/75, both U.S. exports and world trade declined. U.S. coarse grain exports fell 13 percent, mostly because of reduced sales to the Soviet Union, and world trade fell 9 percent. Compared to the other years discussed above, the year-to-year price rise experienced in 1974/75 was not as steep. However, it followed a very sharp increase in the year before.

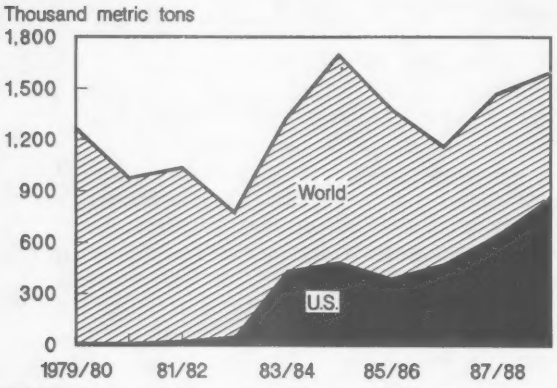
U.S. Imports Dominate Oats Market

U.S. oats imports, which have increased dramatically in the last 5 years, are forecast to increase again in 1988/89 because of the very low U.S. crop and high prices. The supplier pattern will be similar to that of the last few years, with most coming from

U.S. Oats Imports by Supplier



U.S. Oats Imports and Share of World Trade



1987/88 preliminary. 1988/89 forecast. Based on local marketing year.

Sweden, Canada, Finland, and Argentina. U.S. purchases are accounting for a steadily increasing share of world trade. Other significant importers include West Germany, Switzerland, Japan, and the Soviet Union.

The outlook for foreign oats production in 1988/89 is for virtually no change, with output forecast at 37.9 million tons. Among exporters, output should be up significantly in Finland, Sweden, and Australia. Little change is expected in Canada, France, and Argentina, and a decline is forecast for East Germany. After extremely wet weather hurt production in 1987/88, growing conditions in Scandinavia have been excellent this year. A big rebound in yields and production--up a forecast 66 percent--will enable Finland to resume exports at about 200,000 tons. Sweden's crop is forecast up about 7 percent, and exports could climb 50 percent to 350,000 tons. The United States is the largest market for Scandinavia's oats. Both these countries have started acreage reduction programs in recent years to cut the costs of subsidizing exports.

Canada's oats exports are projected at 250,000 tons, down from 300,000 in 1987/88. Even if production comes in below forecast levels, Canada has sufficient stocks to meet export demand, mostly to the United States.

The biggest uncertainty surrounds Argentine prospects. Normally only a small proportion of planted oats is harvested for grain in Argentina, since oats are an important fodder crop. Last year's high U.S. prices stimulated additional harvesting and a big spurt in exports, from 35,000 tons in 1986/87 to 310,000 in 1987/88. Most exports have gone to the United States, followed by the USSR and Romania. Despite interest in increasing production this year, dry weather may have prevented some planting. The availability of grazing and fodder will also influence the amount of oats that Argentina exports, forecast at 300,000 tons for 1988/89.

Australia's exports are projected to rise 33 percent in 1988/89 to 400,000 tons. None of these oats is likely to be sold to the United States. Most sales are to Japan and Western Europe. Similarly, oats exports by France and East Germany will be mostly to neighboring markets.

DROUGHT EFFECTS ON CORN PRICE FORECASTS

by
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Abstract: Producers and consumers of corn are interested in the forecasted price of corn because they must decide when to buy or sell. The season-average price is determined by supply and demand. The measure of supply and demand used was ending stocks divided by use, which was found to be related to farm prices less the loan rate. To estimate monthly prices, seasonal indices were computed for "pre-drought," "drought," and "normal" years. The seasonal patterns were found to be different.

Keywords: Corn price forecasting, seasonal indices, corn stocks-to-use

The forecast price of corn is of interest to both producers with grain to sell and those who use corn during the year. Corn growers must decide whether to sell at harvest or store their corn for marketing at some future date. Corn users also must decide if they will buy their corn at harvest or during the year as they need it.

The price of a commodity may include various statistical components. There can be a long-term trend, which is a general increase or decrease in price over time. There can be cyclical swings in prices requiring several years to complete. In addition, there are random price movements, the result of such factors as drought or changes in agricultural policy. All of these components cause changes in the annual average price. However, prices may also fluctuate consistently within the year. One measure of normal price change from month to month is a "seasonal price index." A seasonal price index gives the month-to-month percentage by which a price is above or below the average price for the year.

The marketing year for a particular crop usually begins with the harvest season. Since most U.S. corn is harvested from September through November, the marketing year begins September 1, so the 1988/89 marketing year will extend from September 1, 1988, through August 31, 1989. A drought not only affects the season average price during the marketing year for the drought-reduced crop, but also the prior or "old crop" year (1987/88).

A drought during the growing season increases uncertainty about the expected crop and causes prices to increase late in the marketing year, therefore changing the "normal" monthly price pattern for the marketing year. Similarly, because prices have usually risen to a high level prior to the marketing year for a drought-reduced crop, and prices fall late in the year as the following year's crop becomes assured, the seasonal price movement for drought years differs from years not affected by drought.

Season Average Price

A major determinant of the season average price for corn is the relationship between ending stocks and use. This is a shorthand way of looking at basic supply and demand. Large projected ending stocks means that supply is well above expected demand, and low projected ending stocks mean that supply is tight relative to use. When stocks are very large relative to use, marketings drive prices down to the loan rate, which acts as a floor as farmers store their corn and keep it off the market. In 1985 and 1986, prices averaged well below the loan rate because of a large volume of generic certificates and the ability to "PIK-and-roll" corn. On the other hand, when supply is limited relative to demand, buyers bid prices well above the loan rate. Thus, the ending stocks-to-use ratio is a barometer of pressures on price.

An estimating equation for farm price was developed using ending stocks and farm

prices for 1973–1984. An exponential functional form was used to reflect the price-floor effect of the loan rate. The following equation converted to log form was estimated using linear regression:

$$PDIF_t = \exp(a + b\ SU_t^c$$

where $PDIF_t$ is the difference between the season-average price and the loan rate for year t; SU_t is the ending stocks-to-use ratio in percent for year t; and a, b, and c are parameters to be estimated. Although nonlinear regression could be used to solve for c, an iterative linear approach was used whereby a and b were estimated for various values of c. An R^2 of 0.72 was achieved with c = 0.3. Estimated parameters were as follows: a = 9.41; b = –4.29. The standard error of the coefficient was 0.85.

A second equation, which might be considered an upward bound to the relationship between corn price and the stocks-to use ratio, was fit to the years 1973, 1974, 1979, 1980, and 1981. These years represent the highest level of price response relative to the stocks-to-use ratio. The equation was:

$$PDIF_t = a + b\ SU_t + c\ SU_t^2$$

where PDIF and SU are as previously defined and a, b, and c are parameters to be estimated. The estimated parameters were as follows: a = 3.88, b = –0.21, c = 0.002966.

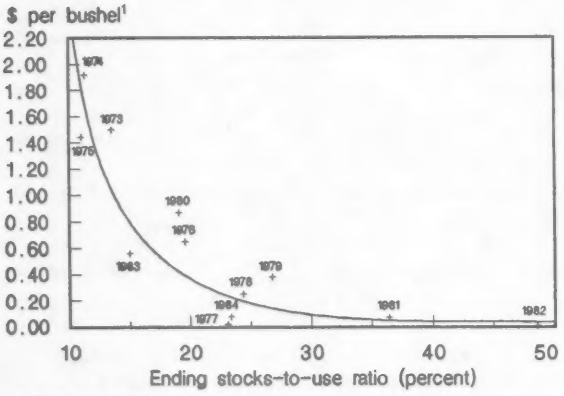
For 1988/89, disappearance is estimated at 7.3 billion bushels and ending stocks at 1.6 billion bushels. Thus, the expected ending stocks-to-use ratio is 21.7 percent. Using the equation above, the season average price would be about 72 cents above the loan rate of $1.77, or about $2.50.

Seasonal Methodology

Standard seasonal analysis packages are designed to determine the "normal" pattern over many years. Since this analysis assumes different seasonal patterns for different years based on drought-related factors, the standard analysis package was not appropriate. Thus, the methodology used was to remove the trend and cycle by computing a centered 12-month moving average, and dividing the original series by this moving average. The result represents the seasonal and irregular components of price. The irregular component is assumed to be normally distributed about the mean, and therefore is removed by averaging the individual months, thus leaving a measure of the seasonal change in price. The different seasonal indexes for "pre-drought," "drought," and "normal" years are determined by the years included in the averaging procedure to eliminate the irregular variation.

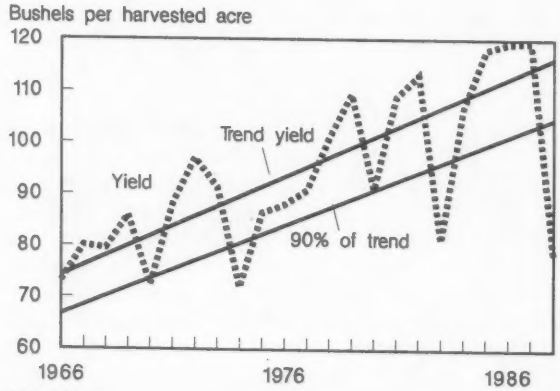
The drought years used in this study included crop years beginning in 1970, 1980, and 1983. These were years in which the yield was reduced by more than 10 percent from trend. Thus, the pre-drought seasonal was computed from the crop years beginning in 1969, 1979, and 1982. The drought year of 1974 and the pre-drought year of 1973 were excluded from the seasonal estimation because of the effect of price controls on demand for

Corn: Farm Price Vs. Ending Stocks



1/ Farm price minus loan rate.

Corn Yields



1988 projected.

corn by livestock feeders. The 1974 drought did boost prices, but the effect of price controls on livestock and on the derived demand for corn caused corn prices to behave much differently than in the other drought years. The normal years included 1971, 1972, 1975, 1976, 1977, 1978, 1981, 1984, and 1985.

The final step in constructing the seasonal index was to compute an adjustment factor for each group of years to give the monthly means a total of 12, then multiplying by 100. The resulting monthly indices give an historical "seasonal" for the different types of years.

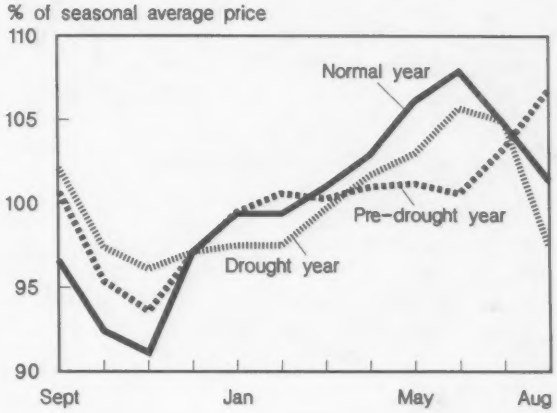
Seasonal Analysis

The marketing year for corn is September through the following August. The seasonal for the years before the drought closely follows the seasonal for normal years for the first half of the year. In normal years, prices tend to increase through June and then drop. This reflects many factors, including heavy marketings during the harvest, increased storage costs during the year, and finally, farmers' anticipation of a good upcoming harvest and the need to sell to clear storage for the new crop.

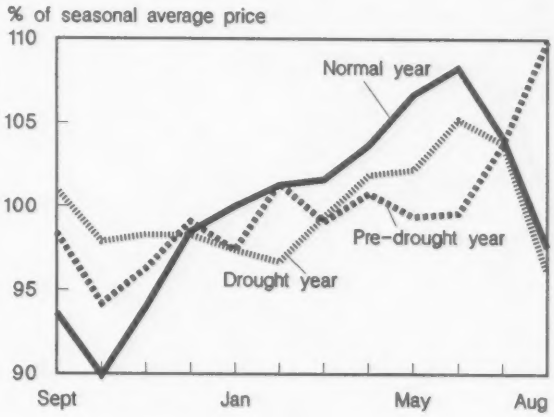
However, in the marketing year preceding a marketing year with a drought-reduced crop, the uncertainty posed by the drought results in higher prices in July and August as farmers tend to hold old-crop corn for higher prices. The seasonal appears to be less volatile during the drought marketing year than the other years. The seasonal during the drought years hits a low point during February, compared with October for normal years, then tends to rise through July, and then drops in anticipation of the next harvest. Seasonals were computed for both prices received by farmers and the cash corn price in St. Louis. The monthly price pattern tended to be the same for both sets of prices.

The differential between cash corn prices in St. Louis and the prices received by farmers can be used to estimate farm prices from the St. Louis prices. In the pre-drought and drought years, the spread was higher in the months when prices increased and declined when prices were lower. This may suggest a constant percentage markup, but further analysis would be required to test this. The average spread was definitely different in the different types of years.

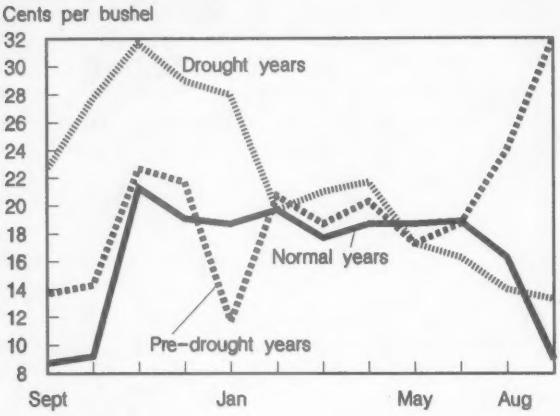
Seasonal Index in Farm Corn Prices



Seasonal Index in St. Louis Corn Prices



Differential Between St. Louis and Farm Price of Corn



Monthly Corn Prices in 1988/89

The ending stocks-to-use ratio for 1988/89 suggests a season-average price of $2.50. This price times the seasonal index gives the monthly pattern expected for prices received by farmers. Cash prices in St. Louis are determined from prices received and the seasonal pattern of margins between St. Louis and farm prices.

Projected corn prices in 1988/89

	Prices received by farmers	Differential for St. Louis	St. Louis cash prices
	Dollars per bushel		
September	2.56	0.23	2.79
October	2.44	0.28	2.72
November	2.40	0.32	2.72
December	2.43	0.29	2.72
January	2.44	0.28	2.72
February	2.44	0.20	2.64
March	2.49	0.21	2.70
April	2.54	0.22	2.76
May	2.58	0.17	2.75
June	2.64	0.16	2.80
July	2.62	0.14	2.76
August	2.44	0.13	2.57

Seasonal price indices for various types of years

Month	Pre-drought	Drought	Normal
September	100.8	102.2	96.6
October	95.4	97.4	92.4
November	93.6	96.1	91.1
December	97.0	97.1	97.1
January	99.5	97.5	99.4
February	100.6	97.5	99.4
March	100.3	99.7	101.0
April	101.0	101.7	102.9
May	101.2	103.0	106.1
June	100.6	105.7	107.9
July	103.3	104.9	104.8
August	106.8	97.4	101.4

Table 1.—Feed grains: Marketing year supply, disappearance, area, and prices, 1983/84-1988/89 1/

Year 2/	Supply				Disappearance						Ending stocks		
	Beginning stocks	Production	Imports	Total	Domestic use			Total	Exports	Total disappearance	Govt. owned	Privately owned 3/	Total
					Food, alcohol, and industrial	Seed	Feed and residual						
	Million metric tons												
1983/84	108.6	136.4	0.7	245.7	28.3	1.5	119.7	149.5	56.6	206.1	8.0	31.6	39.6
1984/85	39.6	236.9	0.8	277.3	30.6	1.5	131.1	163.2	56.6	219.8	8.9	48.6	57.5
1985/86	57.5	274.4	0.9	332.8	33.5	1.5	134.9	169.9	36.6	206.5	20.4	105.9	126.3
1986/87	126.4	252.3	0.7	379.4	34.3	1.2	145.5	181.0	46.3	227.3	48.8	103.3	152.1
1987/88 4/	152.1	215.2	1.1	368.4	35.2	1.2	142.1	178.5	52.3	230.8	31.4	106.2	137.6
1988/89 4/	137.6	137.3	1.4	276.3	34.9	1.3	132.8	169.0	48.1	217.1			59.2

	Area			Yield per harvested hectare	Index	Government-support program
	Set-aside and diverted	Planted	Harvested for grain		Average price received by farmers 5/	Total payments to participants
	Million hectares			Metric tons	1977=100	Million dollars
1983/84	15.9	41.6	32.5	4.20	156	6/ 1,103
1984/85	2.1	49.5	43.2	5.48	130	7/ 1,860
1985/86	2.9	51.8	45.1	6.07	108	7/ 2,785
1986/87	7.3	48.5	41.3	6.11	78	6/ 7,343
1987/88	12.5	43.1	35.1	6.13		6/ 8,928
1988/89	11.4	41.1	33.1	4.30		

1/ Aggregated data on corn, sorghum, barley, and oats. 2/ Marketing year beginning September 1 for corn and sorghum, June 1 for oats and barley. 3/ Includes total Government loans (original and reseal). 4/ Projected. 5/ Excludes support payments. 6/ Deficiency and diversion payments. 7/ Deficiency payments.

Table 2.--Foreign coarse grains: Supply and disappearance, 1980/81 - 1988/89 1/

Year	Beginning stocks	Production	Disappearance: Feed	Disappearance: Total	Imports	Adjusted imports 2/	Ending stocks
			Million metric tons				
CORN							
1980/81	45.8	239.9	168.4	291.7	79.1	78.1	48.9
1981/82	48.9	235.0	175.9	295.6	77.6	67.3	43.8
1982/83	43.8	230.3	174.6	288.9	73.2	63.3	39.1
1983/84	39.1	241.5	167.7	286.1	64.8	61.1	39.9
1984/85	39.9	263.8	183.6	303.0	72.5	66.6	47.6
1985/86	47.6	254.3	186.0	291.7	62.0	54.5	41.5
1986/87	41.5	267.4	193.5	308.1	61.0	56.2	37.5
1987/88 3/	37.5	263.4	191.4	310.7	63.9	55.8	34.7
1988/89 3/	34.7	272.2	199.5	316.0	64.6	57.2	32.2
SORGHUM							
1980/81	6.9	44.6	23.3	49.3	12.8	14.1	8.1
1981/82	8.1	48.2	28.5	55.7	14.3	13.7	7.4
1982/83	7.4	44.0	25.2	51.2	12.3	11.6	6.1
1983/84	6.1	46.5	25.8	52.9	13.1	13.0	6.5
1984/85	6.5	44.1	26.1	51.9	12.9	13.1	6.1
1985/86	6.1	42.1	25.0	48.4	9.6	8.7	5.1
1986/87	5.1	40.5	23.2	46.1	8.1	8.0	4.6
1987/88 3/	4.6	36.7	22.5	44.3	8.8	7.9	3.4
1988/89 3/	3.4	41.7	23.6	48.4	8.9	7.9	2.7
BARLEY							
1980/81	16.9	155.4	107.5	156.0	16.3	14.0	17.1
1981/82	17.1	144.9	105.4	149.6	20.4	14.1	14.4
1982/83	14.4	155.6	107.8	152.9	17.2	13.3	17.9
1983/84	17.9	153.6	115.4	159.3	20.3	16.5	12.9
1984/85	12.9	161.7	115.8	157.7	23.1	18.0	18.7
1985/86	18.7	164.4	120.3	161.8	22.2	18.4	22.3
1986/87	22.3	168.7	125.0	168.8	24.1	18.5	25.0
1987/88 3/	25.0	169.5	127.2	172.5	19.9	17.0	23.9
1988/89 3/	23.9	163.8	123.0	165.4	20.8	17.4	21.7
TOTAL COARSE GRAINS 4/							
1980/81	77.4	533.4	342.0	591.0	110.3	108.3	81.5
1981/82	81.5	519.7	351.7	593.0	114.6	97.8	72.8
1982/83	72.8	533.2	357.2	593.0	104.0	90.0	73.2
1983/84	73.2	550.1	364.6	604.3	100.1	93.4	70.9
1984/85	71.0	576.4	377.4	616.9	111.1	100.4	85.9
1985/86	85.8	566.9	387.3	609.1	95.8	83.2	80.9
1986/87	80.9	581.3	394.7	626.3	95.0	83.9	80.1
1987/88 3/	80.1	572.4	393.2	629.6	94.6	82.7	75.1
1988/89 3/	75.1	580.2	408.5	632.9	96.2	84.9	68.3

NA = not available.

1/ Aggregated on basis of local marketing years, except for adjusted imports. 2/ Based on Oct/Sept. trade year and excludes intra-EC trade. 3/ Forecast. 4/ Also includes oats, rye, millet, and mixed grains.

Source: Compiled from World Grain Situation and Outlook, FAS, and USDA data.

Table 3.—Corn: Marketing year supply and disappearance, area, and prices, 1983/84-1988/89

Year beginning September 1	Supply: Beginning stocks	Supply: Production	Supply: Imports	Supply: Total	Disappearance: Domestic use: Food, alcohol, and industrial	Disappearance: Domestic use: Seed	Disappearance: Domestic use: Feed and residual	Disappearance: Domestic use: Total	Disappearance: Exports	Disappearance: Total disappearance	Ending stocks Aug. 30: Govt. owned	Ending stocks Aug. 30: Privately owned 1/	Ending stocks Aug. 30: Total
	Million bushels												
1983/84	3,523.1	4,174.7	2.7	7,700.5	956.0	19.1	3,817.6	4,792.7	1,901.5	6,694.2	201.5	804.8	1,006.3
1984/85	1,006.3	7,674.0	3.5	8,683.8	1,070.0	21.2	4,079.0	5,170.2	1,865.4	7,035.6	224.9	1,423.3	1,648.2
1985/86	1,648.2	8,876.7	10.6	10,535.5	1,140.0	19.5	4,095.3	5,254.8	1,241.2	6,496.0	545.7	3,493.8	4,039.5
1986/87	4,039.5	8,249.9	2.1	12,291.5	1,175.0	16.7	4,713.7	5,905.4	1,504.4	7,409.8	1,443.2	3,438.5	4,881.7
1987/88 2/	4,881.7	7,064.1	4.5	11,950.3	1,207.0	17.0	4,649.7	6,136.0	1,725.0	7,836.0	1,350.0	2,762.0	4,351.6
1988/89 2/	4,351.6	4,479.4	5.0	8,836.0	—1,210.0—		4,400.0	5,610.0	1,650.0	7,260.0			1,576.0

Year beginning September 1	Area: Set-aside and diverted	Area: Planted	Area: Harvested for grain	Yield per harvested acre	Average prices: Received by farmers 3/	Average prices: St. Louis No. 2 Yellow	Average prices: Omaha No. 2 Yellow	Average prices: Gulf Ports No. 2 Yellow	Government-support program: National average loan rate	Government-support program: Target price	Government-support program: Total payments to participants
	Million acres			Bushels	Dollars per bushel						Mil. dol.
1983/84	32.2	60.2	51.5	81.1	3.21	3.49	3.23	3.67	2.65	2.86	5/ 904
1984/85	4.0	80.5	71.9	106.7	2.63	2.81	2.65	3.00	2.55	3.03	6/ 1,654
1985/86	5.4	83.4	75.2	118.0	2.23	2.37	2.25	2.52	2.55	3.03	6/ 2,470
1986/87	13.6	76.7	69.2	119.3	1.50	1.68	1.53	1.83	1.92	3.03	7/ 6,355
1987/88	23.0	65.7	59.2	119.4	1.90-2.00	4/ 2.05	4/ 1.83	4/ 2.25	1.82	3.03	7/ 7,819
1988/89	21.3	67.5	57.1	78.5	2.30-2.70						

1/ Includes quantity under loan and Farmer-Owned reserve. 2/ Projected. 3/ Excludes support payments. 4/ September 1987-June 1988 average. 5/ Diversion payments. 6/ Deficiency payments. 7/ Deficiency and diversion payments.

Table 4.—Sorghum: Marketing year supply and disappearance, area, and prices, 1983/84-1988/89

Year beginning September 1	Supply: Beginning stocks	Supply: Production	Supply: Imports	Supply: Total	Disappearance: Domestic use: Food, alcohol, and industrial	Disappearance: Domestic use: Seed	Disappearance: Domestic use: Feed and residual	Disappearance: Domestic use: Total	Disappearance: Exports	Disappearance: Total disappearance	Ending stocks Aug. 30: Govt. owned	Ending stocks Aug. 30: Privately owned 1/	Ending stocks Aug. 30: Total
	Million bushels												
1983/84	439.1	487.5	0.1	926.7	7.7	2.3	384.7	394.7	244.6	639.3	102.8	184.6	287.4
1984/85	287.4	866.2	0.1	1,153.7	15.3	2.0	539.3	556.6	296.9	853.5	112.1	188.1	300.2
1985/86	300.2	1,120.3	—	1,420.5	26.0	1.7	663.8	691.5	178.0	869.5	207.2	343.8	551.0
1986/87	551.0	938.1	—	1,489.1	13.0	1.6	532.9	547.5	198.3	745.8	409.0	322.5	743.3
1987/88 2/	743.3	740.9	—	1,484.2	12.6	1.4	520.0	534.0	225.0	759.0	440.0	285.2	725.2
1988/89 2/	725.2	561.0	—	1,286.2	- - 15.0 - -		500.0	515.0	200.0	715.0			571.0

Year beginning September 1	Area: Set-aside and diverted	Area: Planted	Area: Harvested for grain	Yield per harvested acre	Average prices: Received by farmers 3/	Average prices: Kansas City No. 2 Yellow	Average prices: Texas No. 2 Yellow	Average prices: Gulf ports No. 2 Yellow	Government support program: National average loan rate	Government support program: Target price	Government support program: Total payments to participants
	Million acres			Bushels	Dollars per cwt.						Mil.dol.
1983/84	5.7	11.9	10.0	48.7	4.89	5.22	5.53	5.77	4.50	4.86	5/ 114
1984/85	0.6	17.3	15.4	56.4	4.15	4.46	5.04	4.90	4.32	5.14	6/ 158
1985/86	0.9	18.3	16.8	66.8	3.45	3.72	4.33	4.07	4.32	5.14	6/ 228
1986/87	2.3	15.3	13.9	67.7	2.45	2.73	3.24	3.21	3.25	5.14	7/ 598
1987/88	4.1	11.8	10.6	69.9	1.60-1.70	4/ 3.18	4/ 3.55	4/ 3.74	3.11	5.14	7/ 749
1988/89	3.8	10.4	9.0	62.2	2.20-2.60						

1/ Includes quantity under loan and Farmer-Owned Reserve. 2/ Projected. 3/ Excludes support payments. 4/ September 1987-June 1988 average. 5/ Diversion payments. 6/ Deficiency payments. 7/ Deficiency and diversion payments.

Table 5.—Barley: Marketing year supply and disappearance, area, and prices, 1983/84-1988/89

Year beginning June 1	Supply: Beginning stocks	Supply: Production	Supply: Imports	Supply: Total	Disappearance: Domestic use: Food, alcohol, and industrial	Disappearance: Domestic use: Seed	Disappearance: Domestic use: Feed and residual	Disappearance: Domestic use: Total	Disappearance: Exports	Disappearance: Total disappearance	Ending stocks May 31: Govt. owned	Ending stocks May 31: Privately owned 1/	Ending stocks May 31: Total
	Million bushels												
1983/84	216.7	508.9	7.1	732.7	149.5	19.5	282.8	451.8	91.4	543.3	11.9	177.5	189.4
1984/85	189.4	599.2	10.1	798.7	149.0	21.6	303.9	474.5	76.8	551.3	14.6	232.8	247.4
1985/86	247.4	591.4	9.0	847.8	147.2	21.4	332.6	501.2	21.8	523.0	57.4	267.4	324.8
1986/87	324.8	610.5	7.0	942.3	156.1	17.9	296.0	470.0	136.7	606.7	75.5	260.9	336.4
1987/88 2/	336.0	527.0	14.0	877.0	156.1	17.9	255.0	429.0	126.0	555.0	50.1	270.9	321.0
1988/89 2/	321.0	288.0	20.0	629.0	159.3	15.7	240.0	415.0	500.0	465.0			164.0

Year beginning June 1	Area: Set-aside and diverted	Area: Planted	Area: Harvested for grain	Yield per harvested acre	Average prices: Received by farmers 3/	Average prices: Minneapolis: No. 2 or better feed 4/	Average prices: Minneapolis: No. 3 or better malting	Average prices: Portland: No. 2	Government-support program: National average loan rate	Government-support program: Target price	Government-support program: Total payments to participants
	Million acres			Bushels	Dollars per bushel						Mil. dol.
1983/84	1.1	10.4	9.7	52.3	2.47	2.48	2.84	2.91	2.16	2.60	6/ 72
1984/85	0.5	12.0	11.2	53.4	2.29	2.09	2.55	2.59	2.08	2.60	5/ 50
1985/86	0.7	13.2	11.6	51.0	1.98	1.53	2.24	2.23	2.08	2.60	5/ 160
1986/87	1.8	13.1	12.0	50.8	1.61	1.44	1.89	1.96	1.56	2.60	6/ 345
1987/88	2.6	11.0	10.0	52.6	1.81	1.74	1.97	2.09	1.49	2.60	6/ 333

1/ Includes quantity under loan and Farmer-Owned Reserve. 2/ Projected. 3/ Excludes support payments. 4/Starting March 1987, shifted to Duluth. 5/ Deficiency payments. 6/ Deficiency and diversion payments.

Table 6.--Oats: Marketing year supply and disappearance, area, and prices, 1983/84-1988/89

Year beginning June 1	Supply: Beginning stocks	Supply: Production	Supply: Imports	Supply: Total	Disappearance: Domestic use: Food and industrial	Disappearance: Domestic use: Seed	Disappearance: Domestic use: Feed and residual	Disappearance: Domestic use: Total	Disappearance: Exports	Disappearance: Total disappearance	Ending stocks May 31: Govt. owned	Ending stocks May 31: Privately owned 1/	Ending stocks May 31: Total
	Million bushels												
1983/84	219.8	477.0	30.1	726.9	40.9	31.9	470.9	543.7	2.1	545.8	1.5	179.6	181.1
1984/85	181.1	473.7	34.0	688.8	41.0	34.6	432.0	507.6	1.3	508.9	1.4	178.5	179.9
1985/86	179.9	520.8	27.5	728.2	44.0	38.4	459.9	542.3	2.2	544.5	1.9	181.8	183.7
1986/87	183.7	386.4	33.3	603.4	45.0	31.5	392.4	467.9	2.8	470.7	3.5	129.2	132.7
1987/88 2/	132.7	373.8	46.5	553.0	-79.0-		360.0	439.0	1.0	441.0	3.5	108.5	112.0
1988/89 2/	112.0	206.0	60.0	378.0	-86.0-		251.0	301.0	1.0	302.0			76.0

Year beginning June 1	Area: Set-aside and diverted	Area: Planted	Area: Harvested for grain	Yield per harvested acre	Average prices: Received by farmers 3/	Average prices: Minneapolis: No. 2 white, heavy	Average prices: Portland: No. 2 white, heavy	Average prices: Toledo: No. 2	Government-support program: National average loan rate	Government-support program: Target price	Government-support program: Total payments to participants
	Million acres			Bushels	Dollars per bushel						Mil. dol.
1983/84	0.3	20.3	9.1	52.6	1.62	1.87	1.95	2.01	1.36	1.60	4/ 13
1984/85	0.1	12.4	8.2	58.0	1.67	1.81	2.12	1.92	1.31	1.60	---
1985/86	0.1	13.3	8.2	63.7	1.23	1.31	1.60	1.08	1.31	1.60	5/ 8
1986/87	0.4	14.7	6.9	56.3	1.21	1.46	1.53	1.20	.99	1.60	4/ 32
1987/88	0.7	18.0	6.9	54.0	1.56	1.92		1.68	.94	1.60	4/ 27

1/ Includes quantity under loan and Farmer-Owned Reserve. 2/ Projected. 3/ Excludes support payments. 4/ Deficiency and diversion payments. 5/ Deficiency payments.

Table 7.—Corn: Marketing year supply and disappearance, specified periods, 1983/84 to date

Year beginning September 1	Supply				Disappearance						Ending stocks		
	Beginning stocks	Production	Imports	Total	Domestic use				Exports	Total disappearance	Govt. owned	Privately owned 1/	Total
					Food, alcohol, and industrial	Seed	Feed and residual	Total					
	Million bushels												
1983/84													
Sept.-Nov.	3,523.1	4,174.7	0.5	7,698.3	238.6	---	1,311.0	1,549.6	497.0	2,046.6	1,227.0	4,424.7	5,651.7
Dec.-Feb.	5,651.7	---	0.6	5,652.3	222.8	---	1,056.0	1,278.8	508.5	1,787.3	1,214.0	2,651.0	3,865.0
Mar.-May	3,865.0	---	1.0	3,866.0	247.3	16.8	939.5	1,203.6	517.3	1,720.9	195.0	1,950.1	2,145.1
June-Aug.	2,145.1	---	0.6	2,145.7	247.3	2.3	511.1	760.7	378.7	1,139.4	201.5	804.8	1,006.3
Mkt. year	3,523.1	4,174.7	2.7	7,700.5	956.0	19.1	3,817.6	4,792.7	1,901.5	6,694.2	201.5	804.8	1,006.3
1984/85													
Sept.-Nov.	1,006.3	7,674.0	0.9	8,681.2	249.7	---	1,294.2	1,543.9	506.2	2,050.1	206.7	6,424.4	6,631.1
Dec.-Feb.	6,631.1	---	0.4	6,631.5	241.5	---	1,182.9	1,424.4	583.9	2,008.3	209.7	4,413.5	4,623.2
Mar.-May	4,623.2	---	1.1	4,624.3	283.8	17.0	1,009.1	1,309.9	478.9	1,788.8	221.7	2,613.8	2,835.5
June-Aug.	2,835.5	---	1.1	2,836.6	295.0	4.2	592.8	892.0	296.4	1,188.4	224.9	1,423.3	1,648.2
Mkt. year	1,006.3	7,674.0	3.5	8,683.8	1,070.0	21.2	4,079.0	5,170.2	1,865.4	7,035.6	224.9	1,423.3	1,648.2
1985/86													
Sept.-Nov.	1,648.2	8,876.7	1.0	10,525.9	278.0	---	1,215.5	1,493.5	417.7	1,911.2	388.6	8,226.1	8,614.7
Dec.-Feb.	8,614.7	---	1.3	8,616.0	264.0	---	1,299.6	1,563.6	465.3	2,028.9	509.4	6,077.7	6,587.1
Mar.-May	6,587.1	---	2.3	6,589.4	293.0	16.1	1,085.9	1,395.0	204.4	1,599.4	550.9	4,439.1	4,990.0
June-Aug.	4,990.0	---	6.0	4,996.0	305.0	3.4	494.3	802.7	153.8	956.5	545.7	3,493.8	4,039.5
Mkt. year	1,648.2	8,876.7	10.6	10,535.5	1,140.0	19.5	4,095.3	5,254.8	1,241.2	6,496.0	545.7	3,493.8	4,039.5
1986/87													
Sept.-Nov.	4,039.5	8,249.9	0.8	12,290.2	280.0	---	1,383.6	1,663.6	321.1	1,984.7	968.2	9,337.3	10,305.5
Dec.-Feb.	10,305.5	---	0.3	10,305.8	270.0	---	1,472.2	1,742.2	315.4	2,057.6	1,362.2	6,884.6	8,248.2
Mar.-May	8,248.2		.5	8,248.7	310.0	16.4	1,089.9	1,416.3	500.2	1,916.5	1,491.5	4,840.7	6,332.2
June-Aug.	6,332.2		.5	6,332.7	315.0	.3	768.0	1,083.3	367.7	1,451.0	1,443.2	3,438.5	4,881.7
Mkt. year 2/	4,039.5	8,249.9	2.1	12,291.5	1,175.0	16.7	4,713.7	5,905.4	1,504.4	7,409.8	1,443.2	3,438.5	4,881.7
1987/88													
Sept.-Nov.	4,881.7	7,064.1	0.6	11,946.4	292.0	---	1,487.9	1,779.9	398.0	2,177.9	1,683.4	8,085.1	9,768.5
Dec.-Feb.	9,768.5	---	0.9	9,769.4	282.0	---	1,446.9	1,728.9	408.3	2,137.2	1,767.7	5,863.8	7,635.2
Mar.-May 3/	7,635.2	---	1.6	7,636.8	313.0	16.7	960.3	1,290.0	513.8	1,803.8	---	---	5,833.0
June-Aug.3/	5,833.0	---	1.4	5,834.4	320.0	3.0	754.6	1,077.9	404.9	1,482.8	---	---	4,351.6
Mkt. year 2/	4,881.7	7,064.1	4.5	11,950.3	1,207.0	17.0	4,649.7	5,873.7	1,725.0	7,598.7	750.0	3,601.6	4,351.6
1988/89													
Mkt. year 3/	4,351.6	4,479.4	5.0	8,836.0	- - 1,210.0 - -		4,400.0	5,610.0	1,650.0	7,260.0			1576.0

1/ Includes quantity under loan and Farmer-Owned Reserve. 2/ Preliminary. 3/ Projected.

Table 8.—Sorghum: Marketing year supply and disappearance, specified periods, 1982/83 to date

Year beginning September 1	Supply				Disappearance						Ending stocks		
	Beginning stocks	Production	Imports	Total	Domestic use: Food, alcohol, and industrial	Seed	Feed and residual	Total	Exports	Total disappearance	Privately: Govt. owned	owned 1/	Total
	Million bushels												
1982/83													
Sept.-May	318.6	835.1	0	1,153.7	6.0	0.9	453.5	460.4	164.2	642.6	54.0	475.1	529.1
June-Aug.	529.1	0	0	529.1	1.9	0.9	41.3	44.1	45.9	90.0	171.5	267.6	439.1
Mkt. year	318.6	835.1	0	1,153.7	7.9	1.8	494.8	504.5	210.1	714.6	171.5	267.6	439.1
1983/84													
Sept.-May	439.1	487.5	0	926.6	5.7	1.1	356.5	363.3	194.4	557.7	78.0	290.9	368.9
June-Aug.	368.9	0	0.1	369.0	2.0	1.2	28.2	31.4	50.2	81.6	102.8	184.6	287.4
Mkt. year	439.1	487.5	0.1	926.7	7.7	2.3	384.7	394.7	244.6	639.3	102.8	184.6	287.4
1984/85													
Sept.-May	287.4	866.2	0.1	1,153.7	12.4	1.5	542.2	556.1	236.8	792.9	111.1	249.7	360.8
June-Aug.	360.8	0	0	360.8	2.9	0.5	-2.9	0.5	60.1	60.6	112.1	188.1	300.2
Mkt. year	287.4	866.2	0.1	1,153.7	15.3	2.0	539.3	556.6	296.9	853.5	112.1	188.1	300.2
1985/86													
Sept.-May	300.2	1,120.3	0	1,420.5	22.1	1.2	626.9	650.2	140.3	790.5	181.4	447.5	630.0
June-Aug.	630.0	0	0	630.0	3.9	0.5	36.9	41.3	37.7	79.0	207.2	343.8	551.0
Mkt. year	300.2	1,120.3	0	1,420.5	26.0	1.7	663.8	691.5	178.0	869.5	207.2	343.8	551.0
1986/87													
Sept.-May	551.0	938.1	0	1,489.1	11.0	1.0	487.3	499.3	154.8	654.1	400.4	423.3	835.0
June-Aug.	835.0	0	0	835.0	2.0	.6	45.6	48.2	43.5	91.7	409.0	322.5	743.3
Mkt. year	551.0	938.1	0	1,489.1	13.0	1.6	532.1	547.5	198.3	745.8	409.0	322.5	743.3
1987/88 2/													
Sept. May	743.3	740.9	0	1,484.2	10.0	.8	473.5	484.3	185.4	669.7	535.0	147.1	814.5
June-Aug 3/:	814.5	0	0	814.5	2.6	.6	46.5	49.7	39.6	89.3	440.0	285.2	725.2
Mkt. year	743.3	650.0	0	1,484.2	12.6	1.4	520.0	534.0	225.0	759.0	44.0	285.2	725.2
1988/89													
Mkt. year 3/:	725.2	560.5	0	1,285.7	- -15.0 - -			500.0	515.0	200.0			571.0

1/ Includes quantity under loan and Farmer-Owned Reserve. 2/ Preliminary. 3/ Projected.

Table 9.--Average prices received by farmers, United States, by months, 1982-87 1/

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average 2/
						Dollars per bushel							
Corn													
1982	2.15	1.98	2.13	2.26	2.36	2.56	2.71	2.95	3.03	3.04	3.13	3.35	2.55
1983	3.32	3.15	3.17	3.15	3.15	3.11	3.21	3.32	3.34	3.36	3.30	3.12	3.21
1984	2.90	2.65	2.55	2.56	2.64	2.62	2.67	2.70	2.68	2.64	2.60	2.44	2.63
1985	2.29	2.11	2.21	2.29	2.33	2.32	2.29	2.30	2.39	2.32	2.00	1.73	2.23
1986	1.45	1.40	1.47	1.50	1.48	1.42	1.47	1.52	1.66	1.69	1.60	1.47	1.50
1987	1.49	1.56	1.62	1.72	1.77	1.83	1.86	1.88	1.95	2.41			
						Dollars per cwt							
Sorghum													
1982	3.80	3.70	3.78	3.97	4.09	4.42	4.67	4.92	5.05	5.05	5.03	5.29	4.41
1983	5.26	5.01	4.98	4.93	4.92	4.74	4.85	5.00	5.08	4.94	4.64	4.58	4.89
1984	4.24	4.05	4.05	4.15	4.16	4.10	4.24	4.46	4.54	4.52	4.04	3.74	4.15
1985	3.27	3.30	3.47	3.76	3.69	3.55	3.67	3.80	3.99	3.43	3.06	2.66	3.45
1986	2.36	2.34	2.38	2.41	2.37	2.36	2.44	2.58	2.69	2.79	2.66	2.52	2.45
1987	2.43	2.48	2.69	2.72	2.75	2.88	2.92	2.94	2.91	4.13			

Year	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Average 2/
						Dollars per bushel							
Oats													
1982	1.88	1.57	1.39	1.35	1.32	1.40	1.44	1.46	1.48	1.49	1.54	1.54	1.49
1983	1.51	1.46	1.45	1.55	1.62	1.67	1.73	1.81	1.88	1.81	1.82	1.84	1.62
1984	1.80	1.68	1.62	1.60	1.69	1.64	1.72	1.74	1.69	1.68	1.68	1.60	1.67
1985	1.59	1.31	1.16	1.10	1.08	1.17	1.20	1.18	1.16	1.14	1.13	1.21	1.23
1986	1.10	.90	.86	.99	1.10	1.32	1.44	1.46	1.47	1.45	1.50	1.57	1.21
1987	1.52	1.29	1.41	1.49	1.61	1.62	1.76	1.78	1.85	1.78	1.82	1.84	1.56
1988	2.68												
Barley													
1982	2.39	2.16	2.20	2.17	1.98	2.06	2.19	2.16	2.00	2.09	2.22	2.36	2.18
1983	2.32	2.20	2.34	2.46	2.53	2.55	2.55	2.55	2.47	2.50	2.54	2.78	2.47
1984	2.61	2.54	2.26	2.25	2.29	2.25	2.19	2.24	2.21	2.18	2.16	2.22	2.29
1985	2.14	2.08	1.98	1.88	1.96	2.05	2.07	2.05	1.95	1.88	1.85	1.73	1.98
1986	1.57	1.67	1.51	1.45	1.58	1.69	1.62	1.60	1.63	1.69	1.69	1.76	1.61
1987	1.75	1.84	2.00	1.87	1.73	1.88	1.83	1.77	1.74	1.64	1.74	1.79	1.81
1988	2.46												
Malting Barley													
1982	2.26	2.10	2.38	2.58	2.22	2.26	2.39	2.32	2.00	2.09	2.13	2.18	2.24
1983	2.05	2.06	2.50	2.69	2.72	2.61	2.61	2.50	2.47	2.46	2.54	2.53	2.48
1984	2.52	2.48	2.50	2.52	2.52	2.39	2.18	2.29	2.11	2.17	2.17	2.10	2.33
1985	2.02	2.13	2.49	2.33	2.24	2.32	2.19	2.13	1.99	1.93	1.85	1.66	2.11
1986	1.52	2.07	2.23	1.85	1.83	1.80	1.65	1.70	1.69	1.69	1.65	1.66	1.78
1987	1.68	2.04	2.55	2.39	1.88	2.07	2.01	2.11	1.80	1.68	1.76	1.81	
1988	2.80												
Feed Barley													
1982	2.52	2.23	1.98	1.91	1.87	1.94	1.98	2.07	1.99	2.08	2.26	2.43	2.11
1983	2.52	2.31	2.23	2.41	2.45	2.51	2.52	2.58	2.47	2.54	2.55	2.86	2.50
1984	2.72	2.60	2.10	2.13	2.19	2.19	2.20	2.22	2.27	2.19	2.16	2.30	2.27
1985	2.26	2.05	1.75	1.74	1.85	1.90	2.03	2.00	1.90	1.83	1.85	1.81	1.76
1986	1.61	1.44	1.21	1.33	1.49	1.62	1.59	1.56	1.61	1.69	1.71	1.84	1.56
1987	1.79	1.67	1.54	1.57	1.66	1.68	1.63	1.64	1.68	1.59	1.73	1.76	
1988	2.07												

1/ Prices do not include an allowance for loans outstanding and government purchases. 2/ U.S. average prices based on U.S. monthly prices weighted by monthly marketings.

Source: Agricultural Prices, Agricultural Statistics Board, USDA.

Table 10.--Cash prices at principal markets, 1982-1987

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
						Dollars per bushel							
CORN No. 2 Yellow, Central Illinois													
1982	2.14	1.94	2.24	2.28	2.35	2.62	2.82	3.08	3.09	3.14	3.26	3.58	2.71
1983	3.46	3.36	3.37	3.27	3.21	3.15	3.37	3.45	3.44	3.44	3.28	3.16	3.33
1984	2.92	2.66	2.61	2.56	2.64	2.64	2.68	2.72	2.69	2.64	2.59	2.46	2.65
1985	2.28	2.10	2.32	2.38	2.36	2.33	2.29	2.31	2.42	2.41	1.93	1.52	2.22
1986	1.34	1.34	1.55	1.52	1.44	1.38	1.46	1.56	1.75	1.74	1.60	1.46	1.51
1987	1.52	1.65	1.74	1.78	1.85	1.89	1.92	1.92	1.97	2.59			
CORN No. 2 Yellow, St. Louis													
1982	2.32	2.12	2.43	2.49	2.52	2.79	2.99	3.24	3.24	3.27	3.39	3.68	2.87
1983	3.60	3.50	3.53	3.45	3.41	3.31	3.55	3.61	3.58	3.57	3.43	3.33	3.49
1984	3.09	2.84	2.77	2.75	2.86	2.84	2.86	2.88	2.81	2.79	2.72	2.47	2.81
1985	2.38	2.27	2.50	2.59	2.55	2.50	2.42	2.46	2.56	2.52	2.01	1.67	2.37
1986	1.47	1.46	1.68	1.69	1.61	1.57	1.65	1.74	1.93	1.92	1.79	1.65	1.68
1987	1.65	1.78	1.91	1.97	2.05	2.07	2.09	2.10	2.13	2.77			
CORN No. 2 Yellow, Gulf													
1982	2.55	2.33	2.62	2.68	2.74	2.98	3.18	3.39	3.40	3.43	3.57	3.88	3.06
1983	3.75	3.76	3.74	3.64	3.60	3.48	3.74	3.76	3.71	3.73	3.62	3.52	3.67
1984	3.31	3.08	2.98	2.90	3.03	3.04	3.05	3.05	2.96	2.95	2.92	2.67	3.00
1985	2.59	2.50	2.69	2.75	2.72	2.63	2.56	2.57	2.68	2.63	2.12	1.85	2.52
1986	1.68	1.66	1.83	1.81	1.73	1.70	1.83	1.89	2.06	2.05	1.95	1.81	1.83
1987	1.86	2.00	2.08	2.11	2.32	2.23	2.30	2.28	2.29	3.05			
CORN No. 2 Yellow, Omaha													
1982	2.23	2.12	2.35	2.37	2.42	2.62	2.82	3.09	3.10	3.11	3.18	3.39	2.73
1983	3.32	3.23	3.24	3.17	3.11	3.03	3.25	3.33	3.35	3.37	3.22	3.11	3.23
1984	2.94	2.71	2.61	2.55	2.60	2.61	2.68	2.73	2.68	2.70	2.61	2.39	2.65
1985	2.35	2.26	2.28	2.36	2.33	2.31	2.31	2.34	2.43	2.42	2.01	1.61	2.25
1986	1.41	1.40	1.55	1.54	1.44	1.39	1.47	1.57	1.76	1.77	1.59	1.47	1.53
1987	1.51	1.57	1.68	1.75	1.79	1.84	1.86	1.87	1.96	2.64			
SORGHUM No. 2 Yellow, Kansas City						Dollars per cwt							
1982	4.06	3.85	4.25	4.37	4.37	4.54	5.08	5.30	5.37	5.37	5.32	5.69	4.80
1983	5.55	5.37	5.25	5.16	5.09	5.03	5.40	5.36	5.39	5.40	4.95	4.74	5.22
1984	4.46	4.25	4.28	4.32	4.48	4.33	4.58	4.76	4.74	4.74	4.50	4.06	4.46
1985	3.56	3.62	3.75	3.97	3.95	3.80	3.82	4.00	4.25	4.00	3.20	2.71	3.72
1986	2.47	2.60	2.70	2.62	2.50	2.57	2.80	2.85	3.10	3.20	2.80	2.55	2.73
1987	2.64	2.75	2.90	2.95	3.05	3.24	3.27	3.16	3.21	4.58			
SORGHUM No. 2 Yellow, Texas High Plans													
1982	4.39	4.08	4.38	4.65	4.82	5.19	5.52	5.94	5.76	5.81	5.86	5.85	5.19
1983	5.77	5.56	5.49	5.43	5.35	5.14	5.33	5.68	5.67	5.77	5.72	5.46	5.53
1984	5.22	4.95	4.86	4.90	4.84	4.86	4.98	5.14	5.22	5.25	5.24	--	5.04
1985	4.19	4.38	4.30	4.49	4.47	4.36	4.33	4.48	4.77	4.84	3.93	3.36	4.32
1986	3.35	3.24	2.97	3.06	2.94	2.89	3.06	3.32	3.56	3.60	3.58	3.30	3.24
1987	3.19	3.27	3.27	3.39	3.40	3.53	3.56	3.54	3.55	4.84			

Continued--

Table 10.--Cash prices at principal markets, 1982-1987--Continued

Year	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Average
						Dollars per bushel							
OATS No. 2 Heavy, Minneapolis													
1982	2.12	1.87	1.53	1.51	1.51	1.67	1.67	1.67	1.63	1.63	1.73	1.71	1.69
1983	1.67	1.60	1.79	1.94	2.00	1.97	1.94	1.98	1.82	1.88	1.89	1.96	1.87
1984	1.92	1.84	1.77	1.79	1.84	1.92	1.87	1.81	1.82	1.79	1.73	1.65	1.81
1985	1.59	1.44	1.23	1.24	1.19	1.32	1.39	1.37	1.30	1.27	1.16	1.22	1.31
1986	1.18	1.05	1.12	1.29	1.39	1.72	1.66	1.64	1.56	1.46	1.59	1.83	1.46
1987	1.64	1.61	1.77	1.85	1.97	2.05	2.02	2.10	2.06	1.93	1.94	2.12	1.92
1988	2.36												
BARLEY No. 2 or Better Feed, Minneapolis 1/													
1982	2.12	1.85	1.72	1.69	1.54	1.58	1.59	1.63	1.72	1.73	2.01	1.95	1.76
1983	1.96	1.95	2.42	2.61	2.60	2.53	2.39	2.55	2.56	2.65	2.74	2.77	2.48
1984	2.59	2.18	2.13	2.05	2.10	2.06	1.88	1.98	1.99	1.97	2.05	2.05	2.09
1985	1.90	1.66	1.46	1.40	1.41	1.49	1.60	1.57	---	---	---	1.31	1.53
1986	1.23	1.16	1.13	1.27	1.50	1.63	1.23	---	2/	.64	1.76	1.86	1.44
1987	1.73	1.59	1.60	1.76	1.78	1.82	1.74	1.72	1.77	1.88	1.94	1.98	1.78
1988	2.41												
BARLEY No. 3 or Better Malting, 65% or Better Plump, Minneapolis													
1982	2.93	2.63	2.48	2.37	2.42	2.45	2.37	2.38	2.42	2.45	2.68	2.76	2.53
1983	2.60	2.54	2.76	2.90	2.96	2.95	2.77	2.85	2.76	2.91	3.04	3.06	2.84
1984	3.04	2.86	2.48	2.44	2.43	2.43	2.36	2.46	2.47	2.51	2.52	2.55	2.55
1985	2.46	2.25	2.03	2.15	2.10	2.27	2.29	2.28	2.20	2.34	2.40	2.07	2.24
1986	1.84	1.75	1.61	1.76	1.93	2.02	1.88	1.81	1.92	2.01	2.05	2.12	1.89
1987	2.07	1.93	1.73	1.98	2.08	2.05	2.01	2.02	2.15	2.08	2.11	2.24	2.04
1988	3.61												

--- =No Quotes. 1/ Prior to June 1977 reported as barley, no. 3 or better. 2/ Reporting point changed from Minneapolis #2 feed to Duluth #2 feed beginning March 1987.

Source: Grain and Feed Market News, AMS, USDA.

Table 11.--Feed-price ratios for livestock, poultry, and milk, by months, 1982-1987

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
HOG/CORN, U.S. basis 1/													
1982	28.5	28.2	24.6	23.7	23.4	21.9	18.6	15.9	15.1	14.4	13.9	13.9	20.2
1983	13.3	12.8	11.8	14.0	15.4	14.6	14.3	14.3	14.1	14.6	15.8	16.2	14.3
1984	16.0	16.5	18.4	19.0	18.2	18.4	16.3	15.3	15.4	16.9	17.6	17.4	17.1
1985	17.3	20.4	19.5	19.8	19.0	18.4	17.6	17.3	19.2	22.7	29.5	35.9	21.4
1986	40.2	37.9	35.9	33.7	32.1	33.9	32.2	33.4	32.8	35.0	37.3	39.9	35.3
1987 2/	36.4	31.3	25.1	23.4	24.1	25.0	22.7	22.6	23.7	19.5			
BEEF-STEER/CORN, Omaha 3/													
1982	27.5	27.7	25.1	25.2	24.5	23.4	22.7	21.9	21.8	21.2	19.6	18.1	23.2
1983	17.8	18.4	18.3	19.8	21.6	22.1	21.1	20.4	19.7	19.1	20.4	20.7	20.0
1984	21.3	22.4	24.6	25.6	24.8	24.1	22.2	21.5	21.5	21.0	20.4	21.7	22.6
1985	21.8	25.7	27.8	26.7	25.6	24.4	24.0	22.9	23.0	22.3	28.9	36.7	25.8
1986	42.1	42.7	39.7	38.8	40.8	43.9	41.9	42.2	40.2	38.9	41.4	43.9	41.4
1987 2/	42.1	41.4	38.4	36.7	36.4	37.4	38.2	39.4	38.6	29.5			
MILK/FEED, U.S. basis 4/													
1982	1.57	1.61	1.62	1.60	1.59	1.56	1.55	1.49	1.45	1.43	1.45	1.41	1.53
1983	1.36	1.39	1.36	1.34	1.33	1.33	1.34	1.32	1.32	1.32	1.35	1.40	1.35
1984	1.48	1.56	1.62	1.59	1.57	1.57	1.55	1.51	1.47	1.45	1.44	1.47	1.52
1985	1.51	1.56	1.55	1.53	1.48	1.50	1.48	1.48	1.46	1.45	1.51	1.55	1.51
1986	1.61	1.75	1.77	1.77	1.74	1.69	1.63	1.62	1.58	1.57	1.56	1.58	1.65
1987 2/	1.65	1.65	1.65	1.63	1.52	1.48	1.43	1.40	1.37	1.36			
EGG/FEED, U.S. basis 5/													
1982	6.0	6.3	6.3	6.0	5.7	5.8	6.1	5.8	6.0	5.8	5.7	6.1	6.0
1983	6.0	6.2	6.9	7.7	8.8	8.5	7.4	8.5	6.5	5.8	5.8	5.8	7.0
1984	5.9	5.7	6.5	6.3	5.5	5.6	6.3	5.7	5.5	5.9	5.9	6.5	5.9
1985	7.1	7.3	7.5	7.4	7.2	6.9	7.6	6.4	6.4	5.7	6.9	7.3	7.0
1986	7.3	7.0	8.0	7.8	7.3	7.1	6.6	6.6	5.9	6.0	5.7	5.6	6.7
1987 2/	6.7	6.0	6.4	5.8	5.6	5.3	5.8	5.2	4.9	5.2			
BROILER/FEED, U.S. basis 6/													
1982	2.6	2.5	2.5	2.5	2.6	2.7	2.4	2.3	2.4	2.6	2.8	2.8	2.6
1983	2.7	2.5	2.8	2.9	3.1	3.1	3.1	2.7	2.7	2.7	3.0	2.7	2.8
1984	2.8	2.6	2.8	2.7	2.9	2.9	2.8	2.8	3.1	3.2	3.1	3.1	2.9
1985	3.2	3.1	3.5	3.2	3.2	3.1	3.1	3.1	3.4	3.7	4.5	4.6	3.5
1986	3.8	4.4	3.9	3.4	3.6	3.4	3.3	3.2	3.3	3.0	2.9	3.3	3.5
1987 2/	2.9	2.6	2.7	2.5	2.8	2.6	2.8	3.1	3.7	4.1			
TURKEY/FEED, U.S. basis 7/													
1982	3.8	3.9	3.9	3.0	2.9	2.9	2.9	2.7	2.9	3.0	2.8	2.8	3.1
1983	3.0	3.0	3.1	3.5	3.6	3.2	3.3	3.3	3.3	3.3	3.6	3.8	3.3
1984	3.9	4.4	5.0	5.5	4.7	3.8	3.7	3.7	3.7	3.9	4.2	4.5	4.2
1985	5.0	5.5	5.5	5.5	3.4	3.4	3.5	3.5	3.8	4.3	4.5	4.6	4.4
1986	4.7	4.9	4.8	4.0	3.3	3.4	3.6	3.5	3.3	3.4	3.1	3.0	3.7
1987 2/	2.9	2.8	3.1	3.6	2.8	2.6	2.5	2.7	2.8	3.0			

1/ Bushels of corn equal in value to 100 pounds of hog, live weight. 2/ Preliminary. 3/ Based on price of Choice beef-steers, 900-1,100 pounds. 4/ Pounds of 16-percent mixed dairy feed equal in value to 1 pound whole milk. 5/ Pounds of laying feed equal in value to 1 dozen eggs. 6/ Pounds of broiler grower feed equal in value to 1 pound broiler, live weight. 7/ Pounds of turkey grower feed equal in value to 1 pound of turkey, live weight.

Source: Agricultural Prices, Agricultural Statistics Board, USDA.

Table 12.—Price trends, selected feeds, and corn products

Item	Unit	Sept.-Aug. 1986/87 1/	1988						
			Jan.	Feb.	Mar.	Apr.	May	June	July
WHOLESALE, MOSTLY BULK 2/									
Soybean meal, 44% solvent, Decatur	$/ton	162	194	183	192	200	224	288	—
Soybean meal, high protein, Decatur	"	176	212	200	208	218	239	305	—
Cottonseed meal, 41% solvent, Memphis	"	150	188	160	141	143	148	230	—
Linseed meal, 34% solvent, Minneapolis	"	112	146	126	121	130	134	218	—
Meat and bone meal, Kansas City	"	196	239	229	237	244	256	357	—
Fishmeal, 65% protein, East Coast	"	276	449	421	—	426	456	554	—
Corn Gluten feed, Illinois pts.	"	98	118	121	119	118	117	130	—
Corn Gluten meal, 60% protein, Illinois pts.	"	231	309	284	287	276	279	356	—
Brewers' dried grains, Milwaukee	"	80	119	101	86	89	94	114	—
Distillers' dried grain, Lawrenceburg, Ky.	"	107	139	140	136	129	127	132	—
Feather meal, Arkansas Pts.	"	159	265	230	225	219			
Wheat bran, Kansas City	"	45	91	70	75	59	49	91	—
Wheat middlings, Kansas City	"	45	91	70	75	59	49	91	—
Rice bran, f.o.b. mills, Arkansas	"	31	67	56	56	64	45	60	—
Hominy feed, Illinois pts.	"	64	80	78	79	80	82	93	—
Alfalfa meal, dehy., Kansas City	"	92	105	107	106	105	103	113	—
Cane molasses, New Orleans	"	59	60	62	61	57	56	63	—
Molasses beet pulp, Los Angeles	"	94	100	—	—	—	100	103	—
Animal fat, Kansas City	¢/lb.	10.0	11.4	12.5	12.6	12.4			
Urea, 42% N., Fort Worth	$/ton	225	225	225	225	225	225	225	225
Corn, No. 2 white, Kansas City	$/bu.	2.17	2.25	2.28	2.30	2.30	2.30	2.81	—
PRICES PAID, U.S. BASIS 3/ 4/									
Soybean meal, 44%	$/cwt	11.70	13.90	—	—	3.70	—	—	18.00
Cottonseed meal, 41%	"	12.67	14.00	—	—	13.70	—	—	16.00
Wheat bran	"	8.85	9.16	—	—	9.54	—	—	10.20
Wheat middlings	"	7.58	8.36	—	—	8.42	—	—	9.20
Broiler grower feed	$/ton	182	195	—	—	181	—	—	248
Laying feed	"	169	176	—	—	176	—	—	237
Turkey grower feed	"	213	226	—	—	214	—	—	270
Chick starter	"	189	197	—	—	189	—	—	266
Dairy feed, 16%	"	153	166	—	—	166	—	—	199
Beef cattle concentrate, 32-36% protein 5/	$/cwt.	217	239	—	—	232	—	—	274
Hog concentrate, 38-42% protein 5/	"	271	312	—	—	308	—	—	390
Stock salt 5/	"	3.28	3.27	—	—	3.28	—	—	3.31
CORN PRODUCTS, WHOLESALE 6/									
Corn meal, New York Yellow	$/cwt.	11.35	11.35	11.45	11.48	11.51	11.52	13.12	13.97
Grits (brewers'), Chicago	"	8.37	8.34	8.44	8.43	8.42	8.43	10.03	10.96
Syrup, Midwest/West	c/lb.	8.16	7.91	7.91	7.91	7.91	7.91	7.91	10.56
Sugar (dextrose), Midwest	"	21.35	22.50	22.50	22.50	22.50	22.50	22.50	23.50
High-fructose (dried weight in tank cars), Midwest	"	12.22	7.85	7.85	8.44	11.22	11.36	12.14	15.34
Corn starch, f.o.b. Midwest 7/	$/cwt.	9.70	10.75	10.75	11.08	11.23	11.48	12.18	9.87

1/ Preliminary. 2/ Grain and Feed Market News, AMS, USDA, except urea which is from Feedstuffs, Miller Publishing Co., Minneapolis, Minnesota. 3/ Agricultural Prices, Agricultural Statistics Board, USDA. 4/ Prices paid data are available on a quarterly basis only. 5/ Price previously published in cwt. 6/ Milling and Baking News, Kansas City, Missouri, except starch which is from industry sources. 7/ Prior to July 1988, prices quoted were list prices. As of July 1988, reported price changed to net price after discount. Discounts taken from past list prices ranged between $3-5.

Table 13.—Corn, sorghum, barley, and oats exports, 1985/86 to date

Year and month	CORN			SORGHUM	Year and month	BARLEY		OATS	
	Grain only	Total process	Grand total	Grain only		Grain only	Total	Grain only	Total
	Bushels					Bushels			
1986/87					1986/87				
Sept	80,082,655	1,181,307	81,263,962	14,227,263	June	2,000	276,815	79,108	128,492
Oct	124,025,138	818,619	124,843,757	18,547,828	July	1,164,620	1,597,139	81,504	217,421
Nov	114,104,314	848,497	114,952,811	14,680,456	Aug	12,319,164	12,514,711	73,364	335,437
					Sept	12,772,707	12,912,177	121,288	327,625
1st Qtr	318,212,107	2,848,423	321,060,530	47,455,547	1st Qtr	26,258,491	27,300,842	355,264	1,008,975
Dec	109,759,488	925,574	110,685,062	19,954,747	Oct	16,480,986	16,559,353	167,403	411,976
Jan	104,283,400	990,714	105,274,114	15,484,239	Nov	14,292,746	14,363,851	32,293	167,870
Feb	98,787,906	657,881	99,445,787	20,749,712	Dec	14,532,134	14,661,828	17,314	315,049
2nd Qtr	312,830,794	2,574,169	315,404,963	56,188,698	2nd Qtr	45,305,866	45,585,032	217,010	894,895
Mar	143,717,211	1,658,289	145,375,500	24,415,530	Jan	1,205,709	1,262,335	30,960	75,145
Apr	183,288,269	992,304	184,280,573	12,956,519	Feb	16,084,544	16,522,282	30,776	178,452
May	169,091,351	1,485,054	170,576,405	13,788,332	Mar	17,639,725	18,150,611	115,234	277,846
3rd Qtr	496,096,831	4,135,647	500,232,478	51,160,381	3rd Qtr	34,929,978	35,935,228	176,970	531,443
June	120,026,244	791,997	120,818,241	12,940,287					
July	133,984,531	916,175	134,900,706	22,883,734	Apr	16,599,968	17,153,570	105,251	191,418
Aug	111,320,100	688,763	112,008,863	7,698,710	May	10,522,937	10,726,481	67,436	168,607
4th Qtr	365,330,875	2,396,935	367,727,810	43,522,731	4th Qtr	27,122,905	27,880,051	172,687	360,025
TOTAL	1,492,470,607	11,955,174	1,504,425,781	198,327,357	TOTAL	133,617,240	136,701,153	921,931	2,795,338
1987/88					1987/88				
					June	517,681	754,738	104,217	187,886
Sept	135,403,937	727,001	136,130,948	17,832,854	July	7,421,463	7,675,576	50,113	92,430
Oct	137,693,604	1,091,494	138,785,098	16,734,001	Aug	8,893,825	9,257,652	18,135	153,171
Nov	122,468,369	671,935	123,086,304	10,296,951	Sept	10,014,514	10,217,330	24,184	62,343
1st Qtr	395,565,910	2,436,440	398,002,350	44,863,811	1st Qtr	26,847,483	27,905,299	196,649	495,830
Dec	148,189,862	1,096,722	149,286,584	21,462,657	Oct	16,474,137	17,099,495	62,220	144,789
Jan	133,442,601	859,133	134,301,734	19,428,923	Nov	17,914,754	18,114,982	38,617	99,130
Feb	123,706,547	981,138	124,687,685	22,498,453	Dec	15,583,102	16,123,445	5,680	36,703
2nd Qtr	405,339,010	2,936,993	408,276,003	63,390,033	2nd Qtr	49,971,993	51,337,922	106,517	280,622
Mar	164,120,347	1,169,869	165,290,216	24,662,618	Jan	9,595,582	9,833,000	96,376	147,370
Apr	166,544,265	757,197	167,301,461	30,340,887	Feb	6,764,525	7,239,765	29,937	148,578
May	180,228,794	1,011,878	181,240,672	22,103,010	Mar	15,349,596	15,756,273	24,173	49,618
3rd Qtr	510,893,406	2,938,944	513,832,349	77,106,515	3rd Qtr	31,709,703	32,829,238	150,486	345,566
June	132,984,257	849,872	132,834,129	13,740,797	Apr	8,796,666	9,029,851	12,420	114,674
					May	4,470,071	4,979,881	22,950	215,233
					4th Qtr	13,266,737	14,009,733	35,370	329,907
					TOTAL	121,795,916	126,070,192	489,022	1,451,926
					1988/89				
					June	12,108,210	12,375,146	102,245	296,052

Total corn exports include grain only (white, yellow, seed, relief), dry process (cornmeal for relief, as grain, grits), and wet process (corn starch, sugar dextrose, glucose, high fructose). Sorghum includes seed and unmilled. Barley includes grain only (grain for malting purposes, other) and barley malt. Oats include grain and oatmeal (bulk and packaged).

Source: Bureau of the Census, U.S. Department of Commerce.

Table 14.—Corn, sorghum, barley, and oats imports, 1985/86 to date

Year and month	CORN		SORGHUM	Year and month	BARLEY		OATS	
	Grain only	Total	Total		Grain only	Total	Grain only	Total
	Bushels				Bushels			
1986/87				1986/87				
Sept	311,213	332,783	6,329	June	1,296,495	1,501,548	5,325,371	5,345,316
Oct	66,792	107,949	0	July	15,140	223,046	1,841,943	1,868,602
Nov	333,201	353,750	33	Aug	19,469	210,558	1,537,423	1,559,704
				Sept	75,927	307,474	846,095	879,869
1st Qtr	711,206	794,482	6,362	1st Qtr	1,407,031	2,242,626	9,550,832	9,653,491
Dec	66,353	131,009	0	Oct	31,578	207,980	1,262,426	1,292,827
Jan REV.	85,979	134,935	0	Nov	926,059	1,193,914	2,695,161	3,342,153
Feb	14,207	52,622	86	Dec	173,536	310,750	1,241,736	1,261,139
2nd Qtr	166,539	318,566	86	2nd Qtr	1,131,173	1,712,644	5,199,323	5,896,119
Mar	29,812	63,602	0	Jan	392,962	681,307	3,981,067	4,020,146
Apr	400,056	428,391	0	Feb	625,953	772,737	3,994,932	4,027,553
May	19,009	30,652	0	Mar	1,808,103	1,888,079	2,277,619	2,300,061
3rd Qtr	448,877	522,645	0	3rd Qtr	2,827,018	3,342,123	10,253,618	10,347,760
June	326,401	339,131	0	Apr	508,133	591,606	3,401,071	3,434,844
July	32,223	48,591	197	May	792,379	849,842	3,951,545	3,988,454
Aug	71,486	83,860	0					
				4th Qtr	1,300,512	1,441,448	7,352,616	7,423,298
4th Qtr	430,110	471,582	197					
TOTAL	1,756,732	2,107,275	6,645	TOTAL	6,665,734	8,738,841	32,356,389	33,320,668
1987/88				1987/88				
				June	683,655	895,760	3,730,421	3,760,272
Sept	130,361	151,725	-0-	July	195,998	212,386	1,717,932	1,735,424
Oct	354,333	373,790	24	Aug	220,222	434,659	1,541,932	1,582,781
Nov	77,145	101,481	15	Sept	1,061,243	1,396,495	1,712,779	1,744,204
1st Qtr	561,839	626,996	39	1st Qtr	2,161,118	2,939,300	8,703,064	8,822,641
Dec	246,126	298,521	-0-	Oct	926,329	1,222,581	1,270,484	1,372,822
Jan	126,012	167,032	-0-	Nov	876,498	1,209,707	5,106,952	5,148,944
Feb	332,569	388,773	19	Dec	1,146,248	1,384,778	2,537,116	2,566,988
2nd Qtr	704,707	854,326	19	2nd Qtr	2,949,075	3,817,067	8,914,552	9,088,754
Mar	593,592	683,203	12	Jan	1,846,528	2,038,574	4,086,315	4,154,507
Apr	662,637	739,543	50	Feb	1,318,218	1,605,421	9,167,026	9,213,156
May	113,606	140,762	0	Mar	1,163,560	1,280,709	6,426,933	6,482,646
3rd Qtr	1,369,835	1,563,509	62	3rd Qtr	4,328,306	4,924,704	19,680,274	19,850,309
June				Apr	986,537	1,063,805	3,701,098	3,737,802
				May	876,452	961,089	4,721,106	4,756,988
				4th Qtr	1,862,989	2,024,895	8,422,204	8,494,790
				TOTAL	11,301,488	13,705,966	45,720,094	46,256,494
				1988/89				
				June				

Corn includes grain only (yellow dent corn, other), seed, and cornmeal. Sorghum is grain only. Barley includes grain only (barley for malting, other), pearl barley, milled and malting. Oats include grain (hulled or unhulled, unhull oats fit and unfit for human consumption, and oatmeal fit for human consumption).

Source: Bureau of the Census, U.S. Department of Commerce.

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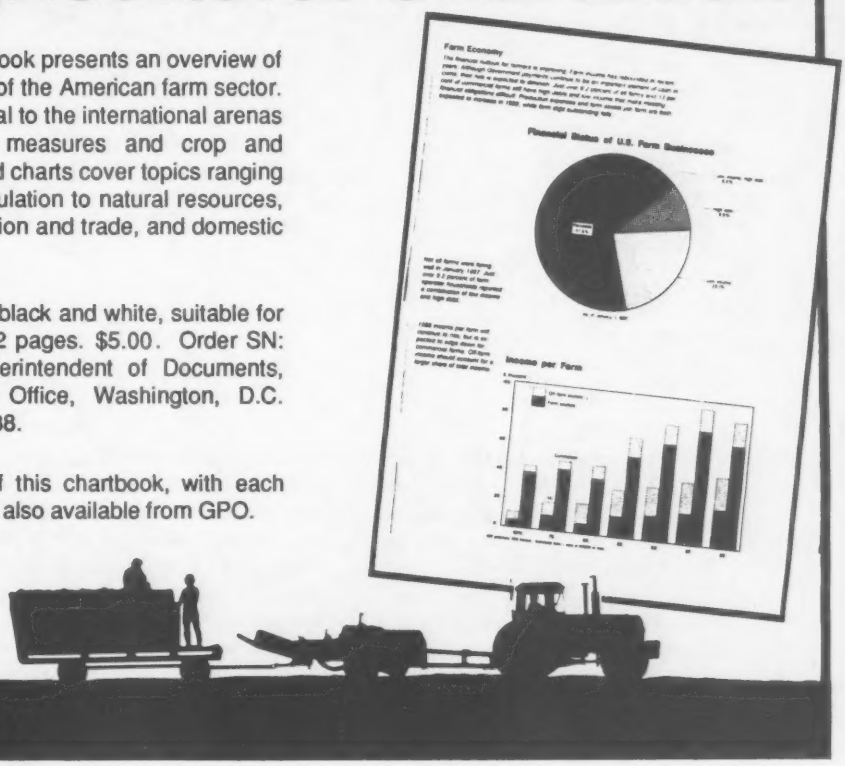

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